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RAIL-ROAD NEWS.

Pittsburg and her Railroads.

Pittsburg will soon be the focal point of some of the most important thoroughfares in our country. In the enumerated list are the Central Railroad, running to Philadelphia, Baltimore, and New York; the Ohio and Pennsylvania Railroad running towards Chicago and St. Louis; the Cleveland and Pittsburg Railroad, running to Cleveland, and connecting with the Lake-shore roads running East and West; the Erie and Pittsburg Railroad, running to Beaver, and thence to Erie; the Pittsburg and Rochester Railroad, running up the Allegheny river, and across from its head waters to Rochester, N. Y., a flourishing city of nearly 50,000 inhabitants;—the Pittsburg and Steubenville and Steubenville and Indiana Railroads, presenting a direct continuation of the Pennsylvania line, and also of the Allegheny river line, through Columbus to Cincinnati.

Ohio and Pennsylvania Railroad.

The work upon the Ohio and Pennsylvania Railroad is progressing with great energy. The entire line between Pittsburgh and Massilon, 107 miles, is graded; 40 miles of it is in operation and the rails are being laid on the rest—all of which will be completed in January. To Alliance the road will be opened next month, which completes a railroad communication between Pittsburgh and Cleveland. The grading between Massilon and Wooster is completed, except four sections. In January next there will be a railway communication between this city and Cincinnati, via Philadelphia, Pittsburgh, Cleveland, &c., for the entire distance, except some 45 miles next east of Pittsburgh.

Twenty-eight miles more of this road are to be opened this week for travel, about fourteen miles between Brighton and Enon Valley, and about the same distance between Salem and Alliance. Stages will be run between Enon Valley and Salem. It is reported that passengers will be carried through to Cleveland, by this route, in less than twelve hours.

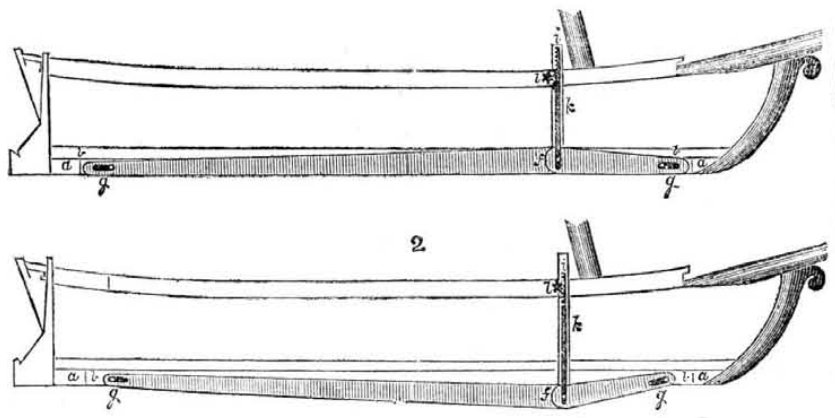
Great Western Railroad of Canada.

We may state, (says the Quebec Gazette), from undoubted authority, that Mr. Atcheson, the agent of the Great Western line of railway, has succeeded in raising, in the English market, all the money required to complete the road, and that more might have been had, if it had been necessary. It is understood that the very strong support given to the scheme in Manchester had the effect of bringing it in favor in the London market. The Colonies of Great Britain appear to be alive to the importance of railroads; they are exhibiting a praiseworthy spirit of enterprise.

Great Railroad Engineering.

On the line of railroad now building from Konigsburg to the Lake of Constance, over the Alps, there are 13 tunnels, and 25 viaducts; 13,000 laborers and 2,000 horses are continually employed on it.

PATENT CENTRE-BOARD.---Fig. 1.



The accompanying engravings represent an invention of Mr. T. Maskill, Franklin, St. Mary's Parish, La., and which was patented in October, 1849. As considerable has been said in the papers lately, more especially the English press, since the America's triumph, about Centre Boards, we presume a knowledge of this patent will excite some interest in the public. Figure 1 and figure 2 are vertical longitudinal sections, showing the centre-board in two positions.

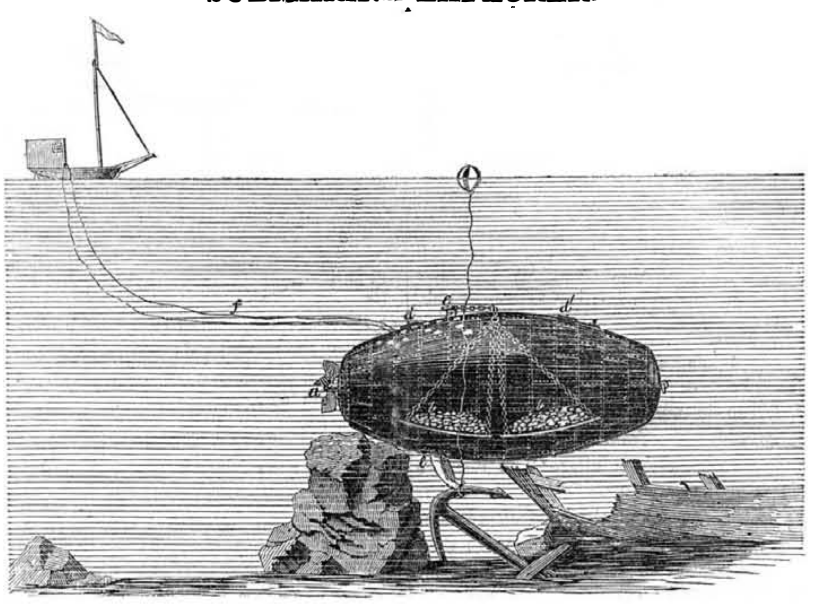
A is the centre-board; it is made of metal and jointed at *f*; it is let into a recess, *b b*, in the false keel, *a a*, to which it is secured on pivot pins, *g g*; it is secured to a metal rod, *k*, near the joint, *f*. This rod has a rack, *i*, on its upper end, into which a pinion, *l*, works this pinion has a shaft and crank handle inside of the boat, by turning which, the rod, *k*, is elevated or depressed, and the centre-board is thus drawn up close in its recess in the false keel, or projected below the keel, to a depth in accordance with the length of the centre-board, whatever that may be, according to the size of the vessel. The rod, *k*, works through the keel in a stuffing box, so there can be no leakage, and although this centre-board, when applied to large vessels, in a stormy sea, were carried away by accident, no injury to cargo or leakage could result. It will be understood that the centre-board is let into a tight recess in the false keel. The board is rounded at the ends, and has a mortise at the joints, *g g* to allow the ends to draw forward when the board is pushed down, as represented in figure 2.

By this invention the keel is not weakened, the floor and other timbers, are not cut into, and the vessel will not be strained in a storm, and will "lay to" better than by the old plan. The centre-board can be made either of wood or metal.

We have the model of this invention in our office; it is worthy of the attention of shipbuilders. If it will not answer a good purpose, Mr. Maskill desires no pay; he desires it to have a fair trial,—nothing can be more candid, open, and fair—honest inventor-like. The following is the claim of the patent:—

"I claim a jointed centre-board, constructed substantially as described, having its two ends connected with the false keel, into which it is recessed, and its centre portions jointed and connected with a rod which passes up into the vessel, by which it can be worked up and down for the purpose described."

SUBMARINE EXPLORER.



The accompanying engraving represents the new submarine exploring vessel, built at Messrs. Pease & Murphy's engineering works, this city, for the Submarine Exploring Co. This submarine vessel is wholly constructed of the best boiler iron, and is of an egg shape, and is very strong. It is thirty feet long and ten feet in its greatest diameter. It weighs 20,000 lbs. It has a capacity of 36 tons displacement. It has a number of holes—as shown by the light spots—in which are fitted strong glass eyes, to give light to the interior. It has man-holes, *d d*, above, which are closed when the vessel is submerged, and it has one *e*, below, which is now open. *a* is a propeller blade, which is worked inside by a crank handle, and which propels the submarine vessel at a moderate speed by hand. The apparatus is exhibited at work getting up an anchor. The person inside has just fastened a rope around it, through the man-hole, *e* through which his arms are projecting. To the rope is attached a hollow copper ball, which serves for a water float or balloon. A number of these are carried inside. It always tells where the anchor or whatever object it may be is to be found. On each side are placed upon strong hinged metal platforms, two safety ballast supporters, *b b*, which are suspended by chains to a strong swivel hook, *c*. This ballast partly sinks the vessel, and by throwing off the ballast it will rise at once to the surface. This can be done in a moment, for the hook, *c*, can be turned round from the inside, when the chains will at once drop back, and the hinged supports, *b b*, drop flat alongside the vessel tumbling out all the ballast. The interior is divided into compartments. The place which the submarine explorers occupy is about two-fifths of the vessel, in the other part are two large reservoirs all made of plate iron, into which are fitted two pairs of pumps having different functions, either for air or water. The object of the duplicating pumps is to guard against those accidents which might render one unservicable. Each pump has four cocks to produce alternately the expansion and compression of the air, and the expulsion or supply of water in such a manner that they may throw off or compress a supply of air or water at pleasure, to the reservoir spoken of inside. The whole operation of this vessel depends upon the displacement of a certain quantity of condensed air, and in taking in or throwing off a body of water more or less by working the pumps. Thus if it is desired to descend from the surface, the crew before closing the top man-holes, will force into the air reservoir, the supply of air necessary to balance the weight of the column of water, proportioned to the depth it is desired to descend; the deeper the descent, the more air is condensed in the reservoir; this prevents the water from coming in below, according to the laws of equilibrium of fluids. Having obtained a sufficient supply of air, the man-hole above is closed, and the submersion of the vessel effected, by using pumps to pump water into the water reservoir. When the vessel has arrived at the bottom, the lower holes are opened, and the persons within can either fish for anchors or gold. A valve communicates with the air reservoir and the apartment of the operators. To ascend, all that has to be done is simply to pump out the water, which before was pumped in; the ballast is only to be thrown off in emergencies.

The atmosphere inside becomes impure, charged with carbonic acid gas, by the breathing of the persons inside; this is kept pure by a pump continually forcing it through caustic lye, which abstracts the carbon and returns pure oxygen. This vessel can safely descend to any depth, from 10 to 100 feet with or without direct or indirect communication with the exterior. This is altogether the reverse of the diving bell, which receives its air always through a tube from the surface of the water. From three to seven men can remain in it for seven hours. The pressure of the air in the apartment in which the men operate, is never above 2½ atmospheres, it therefore can be supported without fatigue: this is also different from the diving bell, the pressure being so great upon the lungs in it as to be oppressive, and oftentimes force the blood from the nose and the ears. A small boat follows the submarine vessel, and communicates with it by telegraph, the wires, *g*, of which are shown. This vessel will be very useful about our harbor, it is the invention of M. Alexander, a French gentleman, and it has been effectually tried in that country. We believe it to be a very excellent and ingenious invention. A company has been formed in this city, named "The Submarine Exploring Company." The gentleman who superintended its construction here, and the owner of it, in the United States, we suppose, is from France. With such a vessel as this, no enemy's fleet could be safe on our coast. In our opinion, it is safe, and will accomplish all that has been claimed for it.

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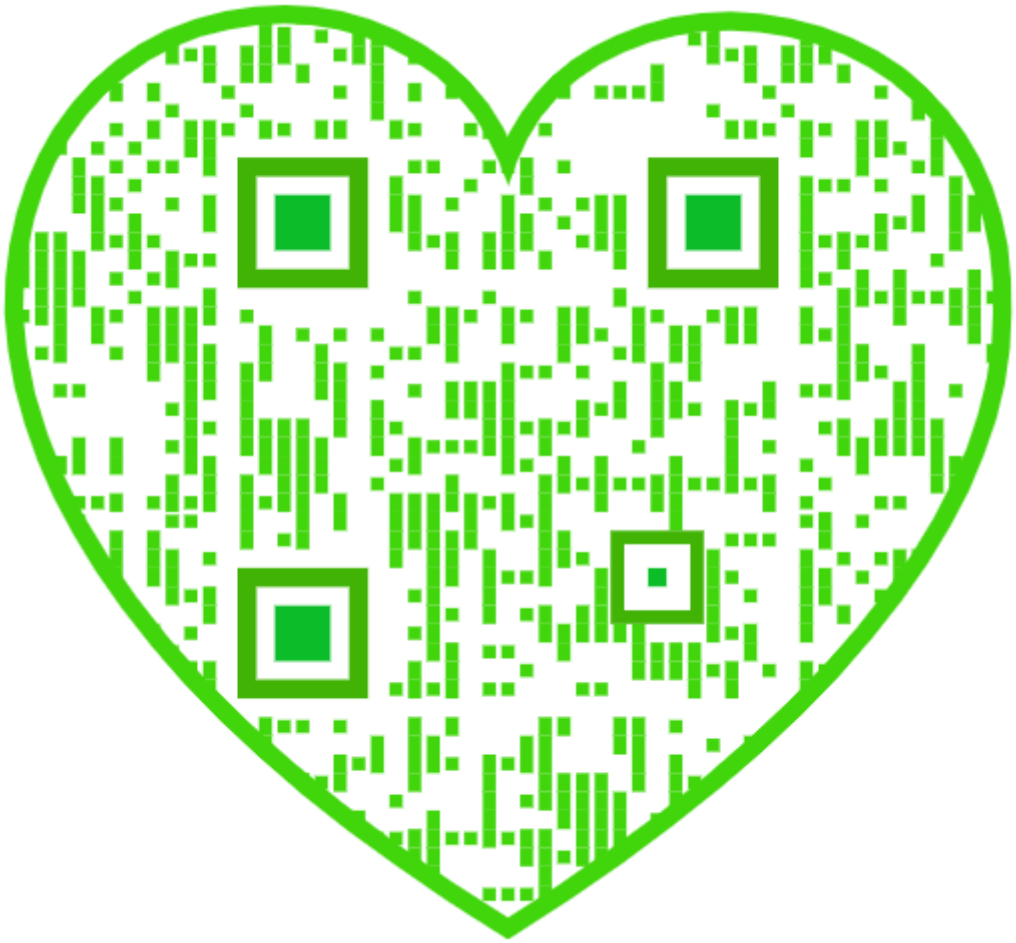

MISCELLANEOUS.

Recent Foreign Inventions.

METAL SHEETS AND COATING METALS.—Mr. J. Davie M. Stirling, of Scotland, recently patented some good improvements in coating metals, &c. His first improvement consists in subjecting sheets or plates of iron to the action of polished rolls, care being taken that the pressure of the rolls be not so great as to make the iron more brittle. For this no rule can be given; some kinds of iron bear a much greater cold pressure than others. This process makes the metal smooth, and reduces the plates to a uniform thickness. The plates should be well cleaned before being submitted to the rolls. A second improvement consists in the application of a coating of zinc and tin to sheets of iron, after which the plates are subjected to the action of polished rolls. The sheet of iron is first coated with zinc, and then dipped into melted tin; the surface of the tin is covered with fat to prevent the metal from oxydizing. The sheet of iron should be put between the polished rolls after each coating. Another improvement consists in coating zinc sheets with tin. This is done by having the melted tin at as low a temperature as possible, and then drawing the sheet or sheets of zinc quickly through it. One, two, or more dips may be given. The sheets are rolled between polished rolls after every dip. The zinc plates are prepared to be dipped in the molten tin by immersing them in muriatic acid diluted with water, after which they are washed and heated nearly to the heat of the molten tin, when they are at once immersed quickly in it. Sheets of zinc thus tinned and rolled, are rendered more ductile and look beautiful. Another improvement consists in making a powder of calomine, to which is added a little borax, and all made into a paste and put on with a brush, between every two plates of iron, in piling; this forms a welding paste, and makes the iron stiffer and tougher, more especially cold short. This is something worth the attention of our iron manufacturers.

RIFLES.—Mr. Robert Adams, of London, gun-maker, has taken out a patent for making rifles with projections in the interior of the barrel instead of grooves. These ridges are like those in rifles after the grooves are cut. The bullets are cast with grooves on them. This appears to be as different from the common rifle as one needle is different from another, but, nevertheless, it has been patented. The forming of the bullet with grooves appears to be a good idea.

Another improvement of this inventor consists in furnishing the breech of a gun with a conical chamber of such a size as will contain the charge of powder, and projecting it into the bore of the gun in the central line of it. The bullet to be used is formed with a cavity at the back part, corresponding to the conical chamber and fitting upon it; not a bad idea.

TELEGRAPH WIRE PROTECTOR.—Mr. Dick, of Ayr, Scotland, has invented a most excellent casing for telegraph wires, which may be submerged. The protector is made of cast-iron, and is thus described:—A large bead of iron is threaded on the cord of telegraph wire, encased in gutta percha, then a perforated cylinder, like a bugle, is threaded on the string next the ball, then another bead is threaded, then another cylinder, and so on, The two ends of each cylinder are made concave, so as to receive the convex surface of the two balls on each side of it. Thus the whole string of beads and bugles make an iron tube, which protects the electric cord on which they are threaded, and it is at the same time so flexible, that a rope of it, massy enough to weigh 30 or 40 lbs. to the lineal yard, will double up in a loop, and can be wound round a man's hat. This is a most ingenious and meritorious invention, and a tube of this character must be perfectly able to protect all telegraph wires from being chafed on rocks by the action of the waves.

This invention, we believe, may be usefully applied to other purposes. For example, let there be tubes of gutta percha, covered with this flexible iron tube, sunk in the East River, what is to hinder the Croton water from being carried safely and cheaply over to Brooklyn? We consider this a most important invention.

SCYTHES.—Mr. C. Hardy, of Low Moor, England, recently took out a patent for improvement in making scythes. He makes his scythe from a single bar of steel instead of iron and steel welded together. The bar of steel is drawn out under a hammer, at one heat; after this it is forged in width and thinned off to the edge. The edge is cut out by shears or a beam cutting machine. After this it is hardened. A furnace is used, and the air prevented from acting on the scythe; charcoal in an open fire will also do as well. The scythe is brought to a red heat, and then immersed in a mixture of suet and mutton fat, with equal parts of resin. On removing it from this it is dried in powdered charcoal, then washed in boiling water, and afterwards beaten in cold water; after this it is re-heated and annealed by covering every portion of it successively, until it attains a violet blue.

ORNAMENTING LEATHER.—F. M. East, of Bermondsay, England, has taken out a patent for an improvement, which consists in dressing, embossing, and ornamenting the flesh side of leather. Heretofore leather has been dressed and ornamented on the grain side. The invention applies to sumac-tanned sheep skins; the skins are shaved sufficiently close to cut out the flames, and render them uniform throughout, and after being immersed in warm water at a temperature of 120°, they are brushed on the flesh side preparatory to dyeing. To prepare them for dyeing, each skin is folded with the grain side inwards (contrary to the present process) and the flesh side out, and the edges are then sewn together; they are then scoured and "sweetened;" they are then dyed in the usual way, but it is better to use weaker liquors and give the skins longer time in them than is usually done. After dyeing, the skins are rinsed and dried. When they are dry they are "perched" on the flesh side, the perching knife should be dull, so as to produce a nap-like surface. Each skin is again folded as for dyeing, and passed through a solution of one part of size, by measure, dissolved in three parts of water. While the skins are wet they are strained on boards to dry, after which the edges are trimmed, and the surfaces bruised with cork to make them soft, the flesh sides being still kept out.

When the operation of embossing is to be performed, clean water is applied evenly upon the grain sides, and they are laid with the grain sides together, flat, for two days, they being covered to exclude the air, by which means the moisture passes through to act on the glutinous matter, and making it of service in causing a gloss to be made on the embossed or pressed parts of the surface, and it also produces a deeper tone of color on those parts. The embossing is done with heated rollers, at 220° Fah. Pigments and metals may be used as substitutes for dyeing; these will be fixed with the sizing.

We are indebted to our invaluable exchanges, "Newton's Repertory of Arts," "Patent Journal," "Mechanics' Magazine," and other London Journals," and to the "Genie Industriel," &c., of Paris, for the above, in substance.

Boats on the Erie Canal.

If the boats of the Erie Canal, five thousand and fifteen in number, were placed in line, they would reach from Albany to Utica, a distance of eighty-three miles. The distance achieved by this enormous fleet, in the year, is equal to three thousand six hundred voyages across the Atlantic—transporting more than three millions of tons, which is twenty-six times the quantity carried by the railroads which run along the banks of the canal. The value, in money, of the property transported by the canal in 1850, was one hundred and fifty-six millions of dollars.

Demonism on Railroads.

We learn from a Columbus (Ohio) paper, that as the Saturday night train on the C. C. and C. Railway was passing between Shelby and Salem, it encountered a telegraph pole placed across the track. The obstruction was thrown out of the way by the cow-catcher, and upon stopping, the road was found to be strewn with planks belonging to the Compa ny. In one spot nine were placed in a heap across the rails. Two men were seen last Wednesday, says the Louisville Journal, placing two bars of heavy railroad iron across the track on the Chattanooga Railroad, at a point where the embankment is fifteen feet high, and but for the fortunate circumstance of a gentleman catching the scoundrels in the act, a whole train of cars would have been thrown off the track.

Men are certainly far more cruel than the savage beast. He who puts an obstruction in the way of a railroad train is not fit to live among men.

Steamboats on the Pacific.

There are ten steamers plying between San Francisco and Stockton. There are ten, also, plying between San Francisco and Sacramento. The latter are, for the most part, of a larger size than those on the San Joaquin river, and make the trip of about 120 miles in from seven to eight hours. In the elegance of their accommodations and the luxuries of their larder, they might compare favorably with any passenger vessels in the world. There are ten other steamers plying from Sacramento to different places above that city. One year ago there was but one steamboat in Oregon, the Columbia; now there are eleven steamboats of different kinds running in the Columbia and Willamette rivers; not including the Pacific steamers Sea Gull and Columbia, running between Oregon and California. The United States will soon be mistress of the Pacific. Steamship lines will, in a few years, be running from San Francisco to Australia, China, and the East Indies. On that great ocean our go-ahead people will have room to strike out: the Atlantic is getting too small for us and other European nations; we need all the Pacific for ourselves.

Coal for Locomotive Engines.

Experiments have been made at Pittsburgh of the adaption of the coal of that region to the purposes of fuel for locomotives. Mr. Ellwood Morris, engineer of the Chartiers Railroad, communicates an interesting statement upon the subject to the Pittsburgh Gazette. He finds by his experiments that an engine of fifteen tons weight, with a tender containing two tons of coal, and drawing the usual train of freight, requires but one bushel of coal fuel per mile, the cost of which is but four cents. Only sixty bushels of coal were used in firing up, running, and standing under steam, while performing the distance of sixty miles. Pittsburgh coal, of the Chartiers Company, was used exclusively.

Why do not some of the railroads contiguous to the coal mines, use coke instead of raw wood. This is the only fuel used on English railroads. It emits no sparks or smoke.

New Comet.

A new and bright comet was discovered on the 22nd of last month, at the Observatory of Baron Senftenburg, in Bavaria, by Mr. Brorsen. It is stated to have a brilliant nucleus, and a conspicuous double tail, one branch being turned towards the sun, which is a rather unusual direction. Mr. Brorsen compares its appearance to that of the bright comet discovered in the spring of 1847.

Suspension Bridge in New Brunswick.

Mr. Wm. Serrel, C. E., of this city, is erecting a suspension bridge near St. Johns. N. B. One of the towers is already completed and the other on one side is approaching towards completion. It is expected that the bridge will be finished about the middle of next summer. Owing to the severity of the winter at St. Johns, the work cannot be proceeded with as in our climate.

Prizes Awarded.

We are glad to learn that our friend A. D. Brown, of Clinton, Geo., obtained four prizes at the late fair in Macon, for the best cotton press, horse-power, gin-saw filer and cheese-press.

Our readers will find an engraving of the cotton press in Vol. 5, Scientific American. Mr. Brown is a good mechanic, and deserves the favors bestowed.

Discovery of Coal in Oregon.

A valuable mine of anthracite coal has been discovered in Charles River, about four miles from Astoria, by a man named Shein. The vein is said to be nine feet wide and three feet thick, and was discovered in digging a well.

Decision Under the Patent Laws.

The case of Uriah A. Boyden vs. Edmund Burke, late Commissioner of Patents, was taken up in the U. S. Circuit Court, at Washington on the 17th inst., and is fully reported. The action was brought to recover damages alleged to have been sustained in consequence of the refusal by the Commissioner to furnish the plaintiff with certain patents then on file in the Patent Office. The fourth section of the act of July 4th, 1837, requires certified copies of the records in the Patent Office to be given to any person applying for the same, at a charge of ten cents per folio. In this case it is alleged copies were refused solely on the ground of Mr. Boyden's repeatedly insulting conduct toward the Commissioner. After the plaintiff's witnesses had been examined, the counsel for defence moved the Court to instruct the jury that upon the whole evidence the plaintiff was not entitled to recover. The instruction prayed for was granted on the ground that the whole section should be taken together, and that the intention of Congress in framing that whole section, was to make certified copies as high evidence as originals. The originals could only be required in cases in Court, and the section clearly intended that any person entitled to call for the originals could demand the copies. There was no evidence in this case that the plaintiff had any right to call for the originals, and therefore had no right to demand the copies.

To this ruling the plaintiff excepted. The jury found for the defendant, and judgment was entered accordingly.

Petition for Extension of Patent.

On the petition of Barnabas Langdon, of Buffalo, New York, praying for the extension of a patent granted to him on the 9th January, 1838, for an improvement in machine for planing shingles, for seven years from the expiration of said patent, the 9th day of January, 1852.

It is ordered that the said petition be heard at the Patent Office on the seventh day of January, 1852, at 12 o'clock M.

Persons opposing the extension are required to file in the Patent Office their objections, specifically set forth in writing, at least twenty days before the day of hearing; all testimony filed by either party to be used at the said hearing, must be taken and transmitted in accordance with the rules of the office, which will be furnished on application.

THOS. EWBANK, Com. of Patents.

New York Exhibition.

We see that some of our English exchange papers are still talking about an Exhibition of Industry in New York. The speculation will be a commercial one entirely, and we suppose will be managed by the late U. S. Commissioner, who appears to have a keen facility that way. We hope the scheme will be carried out. It is asserted that a large building is to be chosen for the purpose in the centre of our city about Canal st., near the great railroad emporiums, and that the goods and articles will remain under bond until sold. The goods are to be taken direct from London, and a great number of works of art are to be sent over, among which the celebrated Amazon, by Kiss, is to figure conspicuously. No American manufacturer is to take part in it—all the works are to be foreign. The price of every article is to be attached to it, so that "he who runneth may read." The Exhibition is to open on the 15th of April, 1852; so it is said, and we hope it will; we only state what is a common rumor, especially on the other side of the Atlantic. Mr. Riddle and Mr. Stansbury arrived in this city by the Atlantic. The former was United State Commissioner at the Fair, the latter took charge of the goods in the frigate St. Lawrence. Mr. Stansbury, we understand, has collected a great deal of excellent information which will be published in a book. He is qualified to do this well.

Shingle Machine.

Two weeks ago we requested, from a correspondent, any one who had a shingle machine—one which could split, shave, and finish the shingle at one operation—to give us information. Mr. C. B. Hutchinson, of Waterloo, N. Y., can furnish any person with a machine that will perform these conditions.

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Manufacture of Fire-Amrs.---Springfield, Birmingham.

A short time since the Springfield (Mass.) Republican had a very interesting article about the manufacture of fire-arms in that place. The following information respecting the manufacture of fire-arms in Springfield, Mass., and Birmingham, England, we believe will be of no small interest to many.

In Springfield there is an armory in which, last year, no less than 21,000 percussion muskets, complete, were manufactured, and 57,000 muskets were altered from flint to percussion. The average number of men employed is 381. We quote what is said ot the mechanism of the gun:

"The manufacture of a single musket is effected by four hundred different operations, and the majority of the men employed engage in only one of the operations. A larger number of muskets were manufactured last year than any other previous, and a calculation, based upon the number turned out, shows that, throughout the year of 313 working days, of ten hours each, a musket was completed every eight minutes and fifty-six seconds. The various parts ot a musket pass, during their manufacture, through the hands of inspectors, who, with their guages, determine the exact dimensions of every piece, and reject every one that is not exactly what is required. Thus, a hundred thousand muskets might be taken to pieces and thrown promiscuously into a pile, and the whole taken up and put together again without the missfit of a single component to its appropriate place. Thus, too, when the arms are in use, there is never need of sending them to the armory for repairs. Hammers, screws, springs, &c., furnished from the armory, as extras, will take the place of any damaged part precisely as if they were made for the arms to be repaired.

The process of manufacturing the musket barrel is one of the most important and difficult in the whole range of the armory operations, and one which is guarded with multiplied tests, at every step of its progress, from the bar to the finished tube. The bar, which is the best Salisbury and Ancram refined iron, is first cut into lengths, weighing 10 3-4 lbs. each. These are rolled into shapes, and then the edges rolled up, lapped into each other and welded. They are then inspected, and the imperfect ones rejected. As they pass along through boring, and grinding, they are subjected to inspection at each step; and the workmen are held responsible for the full value of any barrel they may spoil, at the stage in which it is spoiled, and the amount is deducted from their earnings; and we may say here that the same course is adopted to every component of the musket. The barrel having been reduced to the dimensions required for proof (by powder), which dimensions are three-hundredths of an inch greater in the exterior diameter of the bore, than the finished barrel, leaving an ounce and a half to be worked from each barrel, in finishing; it is then subjected to the powder test. Fifty-five barrels are loaded and discharged at the same time, in a building made for this purpose. Each barrel is discharged twice, the first charge consisting of one-eighteenth of a pound of powder, one ball, and two wads, each wad occupying three-fourths of an inch of the bore, and each ball weighing one-fifteenth of a pound. The second charge consists of one twenty-second of a pound of powder, one ball, and two wads, and each charge is well rammed. The barrels are laid on a cast-iron grooved bed, and the balls are discharged into a bank of clay, which is occasionally washed for the lead it contains.

The inspection of the barrels is so rigid, before they come to the proof, that very few of them burst. After proof they are again inspected, as before, to see that therear no ringbones, cinder holes, flaws, or cracks, are defects of any kind, that will not disappear in the finishing."

Birmingham, England, is the greatest place in the world for the manufacture of muskets and common fire-arms.

According to the census of 1841, the number of persons employed in Birmingham in the various subdivisions of trade required in the manufacture of a gun, in its three great parts—barrel, lock, and stock—was 2,400. This number, however, cannot be held to have expressed with anything like accuracy the total number of persons who procured their subsistence by the gun trade of Birmingham. At the present time it is estimated that about 1,000 persons are employed in Birmingham in the manufacture of gun barrels alone; and that if this number were multiplied by six, the product would represent as nearly as possible the total number of persons in the town and neighborhood who are employed in the manufacture of fire-arms. Birmingham principally supplies the British army and navy and the East India Company's service with muskets, and executes orders for some of the locks, and nearly all the barrels, used by the various persons who reside in London and other parts of the country, and call themselves gun-makers—but whose principal business is to put together and otherwise finish the materials which Birmingham produces. Besides military guns it supplies fowling-pieces and sporting guns of every variety for the home and colonial trade. It also manufactures large numbers of inferior guns for traffic with the Africans. There is a constant demand for guns for Africa. "There is," said a manufacturer, "no end of the quantity of guns made here for that market. The larger portion are taken by the Liverpool merchants. They are bartered generally for gold dust, elephants' tusks, palm oil, spices, &c. The wars among the negroes constantly keep a couple of thousand men at work in Birmingham." The trade with the United States is not so extensive, as the Americans prefer to manufacture their own gun-barrels. Birmingham, however, and the districts around, supply the United States with large quantities of locks.

Damascus guns are manufactured for the nonce in any quantity in Birmingham. The work is done as follows:—

Three bars of iron and three bars of steel, each three inches wide and half an inch thick, are placed alternately upon each other, so as to form a three-inch pile, that is, a pile of iron and steel three inches wide and three inches thick. Especial care is taken that the iron and steel are placed alternately. The pile, after being heated red hot, (or, more properly, raised to a welding heat) in the furnace, is rolled or reduced into a bar three inches wide and three-quarters of an inch thick. This process of course increases the length by diminishing the thickness of the bar. It is next cut into pieces of equal length by means of the steam-shears, or other cutting instruments—which pieces are piled again, four high, making the piles once more three inches thick, care being taken to have the iron and steel bars so placed as not to have two iron, or two steel-sides together. These piles are then put into the furnace, heated to welding heat, and rolled into square rods half an inch thick. These rods are again cut into lengths of about three feet, again heated, and, being fixed into a machine, are twisted in the shape of a screw from end to end. Two of these twisted rods (one forming a right-hand screw, and the other a left, with an equal number of twists or screws in each) are then welded together, and afterwards passed through the rolls, coming out in strings about a quarter of an inch thick and three quarters of an inch wide. The strings of this thickness are for the fore end, or thinnest part of gun barrels. Two other (right and left) twisted rods are also welded together, and rolled into strings of the same width, but three eighths of an inch thick, and these are used for the back part or breech-end of of gun barrels.

The Damascus iron, when polished and rubbed with an acid, displays a beautifully mottled appearance, or "figure" which is much admired. At one time horse-shoe stubs were greatly sought after for the purpose of mixing with the steel, as they were of the best iron, and were thought to aid in the production of the "figure."

They are no longer in the same demand. The Damascus iron having been made, the end of the rod is then grasped by the twisting machine, and held fast by a revolving vice moved by steam power, and twisted while in a cold state, around a mandril, with as much ease as if it were a piece of thread wound around a lady's finger. This is the first stage of the twisted gun-barrel. It is next consigned to the furnace, till it is of a proper heat, when the edges of the spiral are welded together by repeated blows from the hammers of the welders.

The gun-barrel, whether of the common steel or of the common Damascus, is now ready for the next operation, which is that of boring. The business of the gun-barrel borer is to clean and polish the interior of the tube, and at the same time to work it to the size of bore required, and to give it a perfectly smooth and even interior surface. This operation is performed by steam power, and is superintended both by men and women. The process of boring is performed by an angular rod of the har est steel, which is made to revolve in the barrel by steam power, which scrapes the inner surface as it turns. It is necessary that this rod should not be heated, as the friction would in a short time wear down the angularity and render the rod useless A constant dripping of cold water is, therefore, directed upon it, and by this means the boring of an ordinary barrel may be completed in about forty-five minutes. For fine boring the superior barrels of Damascus steel, oil instead of water is used. The barrels are bored with a succession of rods, and the process generally occupies from two hours and a half to three hours, at the end of which time the inner surface of the tube becomes as beautifully smooth and polished as a mirror.

The interior of the barrel being thus completed, it is submitted to the grinders. The stones for grinding the barrels weigh about three tons, and are from three to six feet in diameter. They revolve with a dizzy velocity. The grinders make nearly 18 dollars per week in England; this is good wages, but the business is very unhealthy and dangerous. Sometimes the stones fly to pieces and the dust is hurtful to the lungs and eyes.

There is a law in existence in England against the sale or use of any firearm, the barrel of which has not been proved at the government proof house at Birmingham.

The buildings connected with the proof house form three of the four sides of an interior court; at one extremity of which, and detached, is a small powder magazine. The proof house itself is a detached building. All the interior of this room is lined with plates of cast-iron, three-quarters of an inch in thickness: the door and window shutters of the apartment are also cast-iron. The barrels are set in two iron stocks; the upper surface of one has a small gutter, to contain the train of powder; on this train the barrels rest, with their touch-holes downwards, and in the rear of the breeches of the barrels is a mass of sand. A second mass of sand is formed before the muzzles of the pieces under proof, to receive the balls. When the train of powder is laid, and the gun or pistol barrels placed on the stocks, the window shutters are closed up, and fire is set to the train from without, by the insertion of a bar of red-hot iron through an orifice in the wall. A deafening explosion succeeds. After a short delay, lest any of the barrels should have hung fire, the window shutters are opened, the smoke dissipates, and the attendants remove the barrels.

Gun barrels are bought by gunsmiths all over England. Gunsmiths do not make either the barrels or locks of guns, they only put them together There are plenty of gunsmiths who can make a gun from the very stump. We have seen a rifle made from stem to stern, the barrel finely chased with silver, by a gunsmith in this State.

Colt's Revolver Claimed to be an English Invention.

Sir,—A great deal has been said lately respecting the claim of Mr. Colt to the invention of the revolving pistol; it will, perhaps, throw a light on the subject when we state that in the year 1822, between February and September, we made the barrels of 200 muskets and 200 pistols, upon precisely the same principle as those exhibited by Mr. Colt, for a gentleman named Collier, Fountain-court, Strand, upon which occasion the lubricating fluid, now so universally used by engineers, viz., soap and water, was first introduced by us; one of these very barrels was, we are informed, exhibited in the English Firearm department of the Exhibition. We have one also in our possession, and can easily prove our assertion by our books, which we shall be happy to show to any gentleman upon application, so that the matter may be set at rest as to Mr. Colt being the original inventor. John Evans & Son.

Engine Lathe and Tool Manufactory, 104 Wardour-street, London, Oct,, 1851.—[London Mechanics Magazine.

[It is not an uncommon practice now-a-days to claim many new American inventions to be of English origin, and some of our people do the same thing with English inventions: we cannot believe in the above. Messrs. Evans & Son, we think, have made some mistake. Can any one refer to a published account of their pistols in 1822. We believe not; Mr. Colt is no doubt an original inventor, and we will believe him to be the first inventor until we see some stronger proof to the contrary than the note of Messrs. Evans & Son.

Paris Artesian Well

A late writer on "Paris in 1851," in Blackwood, furnishes the following remarks on this well:—

Near the Hotel des Invalides is the celebrated well which has given the name of all the modern experiments of boring to great depths tor water. The name of Artesian, is said to be taken from the province of Artois, in which the practice has long been known.—The want of water in Paris induced M. Mulot to commence the work in 1834. The history of the process is instructive. For six years there was no prospect of success; yet M. Mulot gallantly persevered. All was inexorable chalk; the boring instrument had broken several times, and the difficulty thus occasioned may be imagined, from its requiring a length of 1,300 feet, even in an early period of the operation. However, early in 1841, the chalk gave signs of change, and a greenish sand was drawn up. On the 26th of February, this was followed by a slight effusion of water, and before night the stream burst up to the mouth of the exavation, which was now 1,800 feet deep; yet the water rapidly rose to a height of 112 feet above the mouth of the well, by a pipe, which is now supported by scaffolding, giving about 600 gallons per minute. Even the memorable experiment confutes, so far as it goes, the geological notion of strata laid under each other in their proportion of gravity. The section of the boring shows chalk, sand, gravel, and shells, and this order sometimes reversed in the most casual manner, down to a depth five times the height of the cupola of the Invalides. The heat of the water was 83° Fahrenheit. In the theories with which the philosophers of the Continent have to feed their imaginations, is that of a central line, which is felt through all the strata, and which warms everything in proportion to its nearness to the centre. Thus is was proposed to dig an Artesian well of 3,000 feet, for the supply of hot water to the Jardins des Plantes and the neighboring hospitals. It was supposed that at this depth, the heat would range to upwards of 100° Fahrenheit; but nothing has been done—even the well of Grenoble has rather disappointed the public expectation; of late the supply has been less constant, and the boring is to be renewed to a depth of 2,000.

Screw vs. Paddle.

An interesting experiment took place recently, at Copenhagen, between two steam-vessels of equal size, 800 tons and 260 horse-power. Each vessel's engines were made by Maudsley, of London. The Holgerdenser (paddle,) carrying two 60 pounders and six 24's; and the Thor (screw,) carrying fourteen 32's, were lashed stern to stern, when the Thor towed the paddle at the rate of 2 8·10ths knots per hour through the water, in spite of her full power applied to her paddles. Being disconnected they were then tried against a strong breeze, when the screw again had the advantage over the paddle; but when they were put before the wind (no sails set) the paddle had the advantage of the screw to the same extent. Both vessels were of similar model, the paddle being a little longer, narrower, and sharper than the other. Both had their armaments, as above, and a full complement of coals on board; the paddle drawing 12 feet 3 inches aft, and 12 feet forward; screw, 15 feet 6 inches aft and 14 feet forward.

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NEW INVENTIONS.

Improvement in Horse Powers.

Mr. A. D. Brown, of Clinton, Jones Co. Geo., has taken measures to secure a patent for an improvement in Horse Powers. It consists in an arrangement of the gearing by which the shaft to which the last or fastest motion is communicated, is made to pass through the centre of the master wheel, said wheel being cogged on the outer periphery. Motion is given to the shaft above mentioned by a pinion on cogs of which mesh into the cogs of the master wheel, the arbor of the pinion works into the outer ends of travelling wings, the opposite ends of the wings encompassing the shaft which passes through the centre of the master wheel. The arbour of the pinion has a pulley upon it, and there is also a pulley upon the shaft aforesaid; a band passes around these two pulleys. The shaft or pole to which the horse is attached, is connected to the lower travelling wing. Motion being given to the shaft or pole by the horse, the pinion is turned by passing around the master wheel, and motion is communicated to the working shaft by a pulley on the arbor of the pinion. The power may be taken off the shaft for driving other machinery above or below the master wheel.

Improved Railroad Truck.

Mr. Abram Snyder, of Hawley, Wayne Co., Pa., has invented an improved truck for railroad cars, which consists in having three pairs of wheels to one truck, and each pair of wheels to be placed in a frame, the three frames being connected by a joint in such a way that each frame will conform to the curvatures or inequalities of the road without causing any strain upon the others. He employs cast-iron frames which cannot be employed in the ordinary trucks. On the upper surface of the truck, and over the joint is placed a circular rim, which serves as a guide to the pair of wheels in the centre of the frame. This guide prevents the centre wheels from getting off the rails, and it also is acted upon by the front frame, so that the centre wheels are assisted in turning or conforming to the curvatures of the road with as little friction as possible.

Measures have been taken to secure a patent.

Improvement in Burglars Alarm.

Messrs. L. J. Worden and E. H. Space, of Clinton, Oneida Co., N. Y., have taken measures to secure a patent for an improvement in Burglars Alarms which consists in securing the lever that acts upon the pallet in such a manner that when the lever is thrown up by the opening of the door or window, (to the casing of which the instrument is attached) and the pallet left free to be acted upon by the escape wheel, the lever will be secured by a catch when thrown off. The object of this is to prevent burglars, after entering a door or window, to stop the alarm. A button is also attached to the door, and so arranged as to act upon a lever and sound the alarm when the door is opened, or not to be acted upon, as may be desired.

Improved Machine for Cutting Sash and Mouldings.

Mr. C. B. Morse, of Rhinebeck, Dutchess Co., N. Y., has invented some good improvements on machinery for making sash and mouldings, for which he has taken measures to secure a patent. The cutter is formed of two circular plates placed on the same shaft, and so arranged that the said plates may be set at a greater or less distance apart as desired in order to cut different mouldings. The cutters are adjusted by set screws. He also employs shields which prevent the feed rollers from forcing the stuff against the cutters, when acting upon the end of the stuff to be cut out. The shields also prevent the rollers from loosening the grains of the wood, and also from forcing out pieces from the end of the rough material.

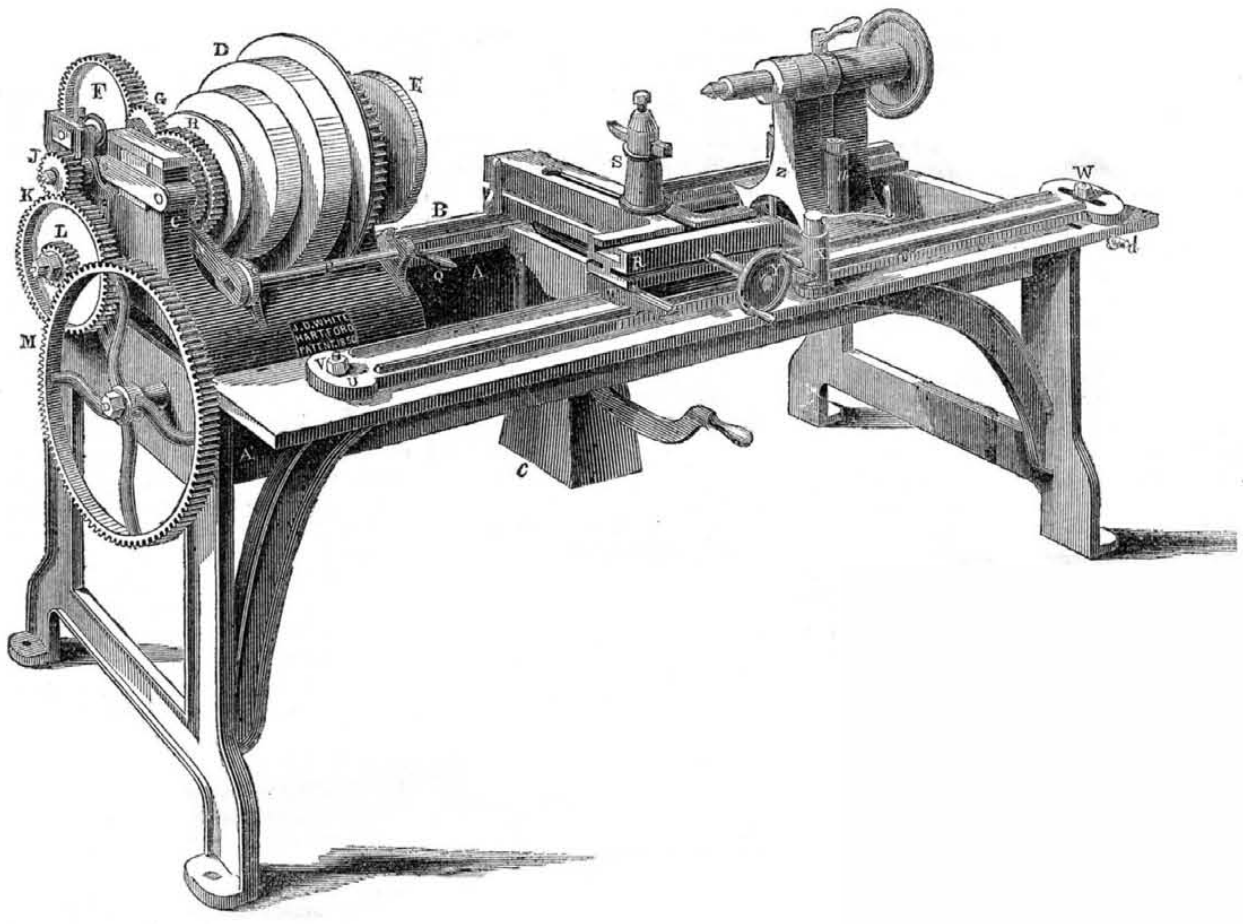
Improvement in the treatment of Calf Skins During the Process of Tanning.

Mr. Henry Halsey, of Windsor, Hartford Co., Conn., has taken measures to secure a patent for a very valuable improvement in the treatment of calf skins during the process of tanning the hides, whereby the hacks are removed, and finished skins for boot and shoe uppers rendered much more marketable. The improvement although it removes the hacks, also renders skins more uniform in thickness, therefore they are much smoother. The improvement will no doubt soon be introduced into the art, for the manufacture of upper leather is one of the most important in our country. Every improvement should receive prompt attention from the trade in general.

New Electro-Magnetic Engine.

We learn by the last number of the London Mechanics' Magazine, that Messrs. Harrison have provisionally registered a new electro-magnetic engine, which appears in principle not good. It is said to consist of induced magnetic power of compound coils which draw within a suitable aperture, or repel therefrom a series of plates of soft iron, or permanent steel magnet. The inventors state they can obtain any length of stroke by reciprocating action, and they reduce the effect of the secondary currents to retard the motion of the moving magnet. The larger the engine, the greater is the economy of it stated to be. They have got the principle of Prof. Page, but have not such a good arrangement. They are a little behind him with their invention although they state that they have been experimenting for years. The inventors state "they have obtained a power cheaper than steam; we do not believe it."

WHITE'S IMPROVED LATHE.



The accompanying engraving represents a Lathe of Mr. J. D. White, of Hartford, Conn. a patent for the principle of taper cutting being granted to him on the 21st of May, 1850.

The engraving is a perspective view, and the lathe is one of the best construction, and the workmanship is of the best description. On page 267, of Volume 6, is an engraving of Mr. White's double lathe for turning the axles of railway cars; an account of the nature and principle of this invention, is there set forth, and it requires but little to be said about that at this time. This is a view of the principle applied to the single lathe. That principle is a movable slide to guide the rest, and which can be set at various angles so as to turn tapes, and at the same time it is equally as good as any other lathe for every kind of work a lathe can perform. B is a slide on one side; the other is covered by the *way*. C is a fixed standard of the gearing; D is the train of pulleys; E is the live centre; E G F J K L M are the train of gear wheels and pinions for the different kinds of turning, &c., to give the requisite velocity to the screw shaft, and M is the gear wheel of the same. This shaft passes through the screw eye on the slide rest, (but which cannot be seen) in the usual way. R is the slide rest; S is the tool stock with the cutter inserted in it; Y is the screw for setting the tool at the proper distance to act on the article to be turned; Z is the movable poppet centre head; *a* is a screw bolt (there is a like one on the other side) to fasten it down on the table; U is the movable way to be set in and out at various degrees, to cut tapers. It guides the slide rest R. V is its pivot axis. W is a screw to fasten it at the movable end. It works in the slot, the use of which will at once be perceived. This movable guide way is reversed quickly by a pinion on Y, working into a rack, *b*, on the edge of the guide way. *c* is the draught weight. Q is a handle to operate the rod, P, and an eccentric lever, N, to throw the gears in and out, with pinions on the back shaft, for changing the velocities as mentioned; *d* is a screw for setting the movable guide way in and out to the proper distance. This lathe is well adapted to chucking, and its utility for parallel and taper turning is self-evident. By using a card of reference, this lathe can be set in an instant to cut the same taper a year hence, which may be cut to-day.

This lathe is for sale at Leonard's machine depot, No. 106 Pearl street, this city, where it may seen, an examination of it will be of interest to all machinists. Mr. White is now manufacturing these lathes. He produces none but the very best work.

Transfusing of Blood.

The French papers state that a very interesting experiment has been lately performed at the Hotel Dieu of Lyons. A female was brought into the hospital who had been seized with violent hemmorage. Her condition seemed desperate. Death appeared imminent, inevitable.

Doctor Delorme suggested transfusion.—This was at first combatted by the other physicians as offering no chance of success, but was finally assented to, as, the case being a desperate one, it could do no harm, even if it did no good. One of the young aspirants, residing in the hospital, offered to furnish the blood necessary to the operation. A syringe was immersed in warm water and kept there till it became of a temperature a little higher than that of blood in circulation. The proper vein in the arm of the sufferer was then opened, and a fine canula, or tube, was introduced to some length. The other end of the tube was then fitted to the syringe, which was enveloped in warm towels, and in which was the necessary quantity of pure human blood. The operator then gently forced into the veins of the dying woman the revivifying fluid.

At this moment, as she afterwards declared she felt a grateful warmth spread over her body, without having the reasoning faculty strong enough to trace it to any cause. Soon after she recovered, in a great degree, her senses and eye sight. A few hours later, a reaction manifested itself so violently, that the physicians were seriously alarmed. It seemed as if death might result as well from too much —too active vitality—as from vitality too much exhausted and enfeebled. But a calming potion soon diminished this unnatural action, and the patient has since been regularly improving. The last intelligence from Lyons states that it is now hardly possible that a relapse can occur, and that the cure may be set down as complete.

The America.

Quite an interesting discussion has sprung up in the columns of the London Mechanics' Magazine, respecting the merits of the model of the Yacht America. It seems to be conceded (and how could they help it?) that she is much superior to any of the British-built Yachts; J. Scott Russell comes out upon the strength of it, and other vessels he has built, in presenting a good argument in favor of the wave line theory.

Borax.

This very useful article is extensively manufactured in Tuscany: no less than 7,500 lbs. of boracic are produced every day. The revenue amounts to 10,000,000 francs per annum. Borax is a sub-carbonate of soda, and is much used for welding purposes, also as a wash for the hair, and as a gargle for diseased throats.

Ontario and Huron Railroad.

The Ontario and Huron Railroad, connecting lakes Ontario and Huron, we learn from the Chicago Democrat, is to be completed in fifteen months, at a cost of $2,000,000 of which $1,700,000 has already been provided. The western terminus is Goodrich. Immediately after the completion of the road, a line of steamers will run between Chicago and Goodrich, in connection with the road, and a line of steamers on Lake Ontario.

Kossuth.

This great patriot, and perhaps the most fluent speaker in the world at the present day, will soon be on our shores. The members of the press in this city are preparing to give him him a spirited reception.

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Scientific American

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Chemistry.

There is no science to which the public is so much indebted as chemistry, and there is none respecting which so little is understood by the great mass of mankind. Although chemistry is a lofty science, demanding the highest range of intellect and industry to investigate and explore, it is also a very humble science; and there are none so lowly or limited in mental grasp, who may not acquire a great deal of useful and profitable information by its study. It enters into the operations of the kitchen, and there is no one who boils a pot or a pan but would do so in a superior manner by a knowledge of it. It enters the laundry, and should preside at the wash tub, for it can tell how to save soap, by rendering hard water soft; and it can tell how to extract the most inveterate stain that soils the snowy cambric. Chemistry can take up the sand on the sea shore and make it into the crystalline globe, or it may be to sparkle on the finger of the fair, as a false but still beautiful gem of the diamond, the ruby, or emerald hue.

Chemistry is truly a magical science, and to show how simple, useful, and beautiful its principles are, we will refer to an article in common use and well known to all. We all know how common and how useful an article soap is; it cleanses our clothes, and renovates the whole outward man. If we inquire—"What is this substance?" we are answered by chemistry telling us that one of its principle ingredients is oil or grease—a substance which we always wish to get removed from our clothes and our persons as soon as possible. If oil is thrown into water it will not mix with it, but will swim on its surface; but here chemistry steps in and says, "look at this piece of crystal, almost like glass,—it is a metal named potassium (or it may be sodium), combined with the air we breathe, and which we cannot see; if you take this crystal and put it into warm water, unlike glass, it will melt and disappear, and you cannot distinguish it from the water with which it unites; now take your oil can and pour it into the water and stir it well; the oil no longer floats; it mixes with the water, and, if it is olive oil, you may taste of it without fear, and scarcely be able to challenge the liquid from sweet milk. If this substance is boiled up it becomes soap, and when moulded into cakes and laid past to dry, it forms the choicest kind for the toilet." More common soaps are made out of tallow and soda, and a poorer kind out of palm oil or grease, and potash. Here we find two substances, the soda (or the potash), called an alkali, and oil or grease, totally different in their uses and natures, uncombined, but which, when united, form a substance entirely different in its nature and uses from the single qualities of either. Here we have a starting point for chemical investigation; and although we might have chosen a higher text, we could not have selected a more suitable one for the object we have in view. But chemistry does not stop with its investigations at the soap; it goes further. It is well known that soap will remove grease and dirt freely when used with rain and what is termed "soft water," but when used with some kinds of water, the soap curdles and is precipitated in flakes, and an extra amount of it is required; chemistry has found out that the water which we call "hard," so beautiful and pelucid, is not pure. It contains, unseen, chemical matter which decomposes the soap, and separates the two substances of which it is composed, and not until there is soap enough dissolved in that water to satisfy the hard claims of matter in the water, will the soap be allowed to act upon the grease in clothes.

Chemistry is a science altogether of experiment,—no one can tell how two newly discovered substances would act until an experiment was made. Well, by experiment, it has been found—we wish particular attention to this point—that the substance which enters so largely into the most of our hard waters, rendering them very unfit for washing, causing great expense to the dyer, calico printer, and soap-maker, is carbonate of lime (chalk). Hard waters, although held by many to be pleasing to drink, yet they are very expensive to those cities, and many kinds of public works which are supplied by them. The waters which supply the city of London, it is asserted, deliver every day twenty-eight tons of lime to its inhabitants. Streams which flow through chalk and lime formations, contain a great deal of the carbonate of lime (chalk) in their waters; this is the case with the Saquoit Creek, the hardest wrought manufacturing stream, we suppose, in the State of New York. Iron and alumina (in the form of clay) also render water hard, but, excepting after freshets, these are not found in any considerable quantities in streams. A few years ago it was discovered by Dr. Clark, that (like oil used for removing oil in a soap) lime removed lime from hard water, and rendered it soft. All waters impregnated with lime absorb carbonic acid from the atmosphere; limestone is the carbonate of lime, and by burning it in a kiln, the carbonic acid is driven off, and we have quicklime, or oxide of calcium; this quicklime—decarbonized limestone—when stirred into water containing carbonate of lime, unites with the carbonate and other impurities also, in the water, precipitating them to the bottom, purifying and rendering the water soft. Nine ounces of pure fresh lime, dissolved in 40 gallons of water, will purify 560 gallons of hard water—the precipitate is chalk. It takes sixteen hours for the water to settle and all the impurities to fall to the bottom of the vessel which contains the water. This is a useful fact in chemistry, and is not very extensively known. The quicklime is dissolved in water and added to the hard water, and when we consider that nine ounces of the hydrate, or quicklime, will combine with the bicarbonate of lime in hard water, and purify 600 gallons of it, we consider this one of the most useful and valuable discoveries in chemistry. It is one valuable to our calico printers, bleachers, dyers, soap-makers; in fact it is valuable to every family in our land.

We would like to impress upon the minds of young persons in the families where the Scientific American is read, the value and necessity of acquiring chemical knowledge. We know that our children are taught some chemistry—worse than none to them—in the schools, but the lesson we wish to inculcate, is reading, study, and personal experiments in leisure hours. We have good works for the uninitiated to commence the study, in Youman's Chart, and Elementary Chemistry, and there are other works for more intricate and extended information afterwards. Every new fact which a person becomes acquainted with in science, is an addition to his stock of knowledge.

To the farmer, a knowledge of chemistry is invaluable for it teaches him the substances which are contained in and are necessary to the composition and usefulness of the bread of man, to one of which chemists give the name of the phosphate of lime. This material the growing wheat extracts from the soil; without its presence in sufficient abundance in the earth through which its roots spread, the plant flourishes poorly, the ear is ill-filled, and the produce of grain scanty. The bones of animals contain this phosphate of lime; but chemistry established the fact that certain stones and rocky masses, which occur in various parts of the earth, also contain it, and with these the farmer may renovate his soil and make the desert blossom like the rose.

Our subject is one which we might elaborate into a volume, but we trust we have said enough upon it at present to present its claims to many of our readers, so as to point a moral rather than adorn a tale.

And, to conclude this article, we do certify that, within a week from this date, we were shown a patent, granted for a chemical composition, and for which the assignees paid $8,000 for the State of New York alone, which had they been as well versed in qualitative chemistry as the writer of this, they would not have paid eight cents for, as the composition is worse than useless for the purposes intended, and this the assignees have truly felt to their loss and sorrow.

The study of chemistry, like any other branch of natural philosophy, is one which always rewards every student of it.

The Hillotype.

Our readers will remember that we have twice alluded to an invention in the Daguerreotype Art, by a Mr. Hill, in this State, who, either himself, or his friends for him, claimed to have made the discovery of forming his daguerreotypes with all the natural colors of wood and wild. A beautiful landscape of Mr. Hill's residence was said to have been done, and exhibited at Albany. It was stated that a number of persons had seen several beautiful colored pictures by Mr. Hill, one of which was that of his own child, or some other child, painted by the sun in all its rosy colors, and displaying a pearly tear on its cheek. We thought it very wonderful how those pictures were so slow in finding their way into Gotham—the city for all such wonders; but then Mr. Hill stated that there was always some little bit yet to be discovered, some perfective touch to be given to one color, and that color was yellow; he never could color a yellow. Prof. Morse, we believe, wrote a letter about this great discovery, its value, and its reality; but after all, it is asserted by the daguerreotype artists of this city, that all this alleged discovery has been a delusion. "The Daguerrean Association," of this city, appointed a committee to wait on Mr. Hill, find out about his alleged discovery, and report. They have done so; they waited on Mr. Hill, at his residence, on the 13th inst., and stated their business, and the result is, that they conclude their report to the Association in the following language:—"Mr. Hill has deluded himself, thoroughly and completely—the origin of the discovery was a delusion, and the only thought about it, in which there can be no delusion, is for every one to abandon faith in Mr. Hill's abilities to produce natural colors in daguerreotypes—the whole history of which has been a delusion."

Well now, this appears to be pretty hard for poor Mr. Hill; but, if he is not deluded, he can easily open the eyes of a wonder-waiting world by producing the pictures. It is really too bad; but this will not end delusions while Dr. Roback lives.

Improvement in Railroads.

"Under this head we published a description of a new invention, which has been copied and criticised in the Scientific American. The criticism shows a complete misunderstanding of the principle of the invention, and supposing a want of clearness on our part, we will repeat it briefly. Two parallel lines of rails three feet apart, and elevated from two to six feet above the ground, are maintained by appropriate contrivances against the sides of wooden posts, in such a manner as to leave the space free above, under, and between them. Cars and a locomotive of a light frame being placed upon the rails, each car is then firmly united by braces and stays with beams running cross-way under it, one under each extremity. These beams are lower than the rail, and long enough to have their extremities under them; to these extremities are attached artificial magnets—or, if it will make it any clearer, natural loadstones—which by their tendency toward the rails above, will counterbalance as large a part of the weight of the cars as the constructor thinks desirable, the remainder of the weight being left to act on the wheels. In this way a locomotive of small power, and consequently light, will prove sufficient to draw the train with great velocity."—[N. Y. Tribune.

[We must say to our worthy cotemporary, that we perfectly understand the principle of the invention spoken of; there was no misunderstanding of the subject. We will quote from the other article referred to above, to show that the explanation of the invention makes it quite a different invention.

"At the two extremities of each car, and in the middle, at a sufficient distance from the wheels, are attached powerful magnets, made of an immense number of reels of wire, wound round pieces of soft iron, the poles placed directly below the rails, and as near them as practicable. The effect is easily understood. As soon as the wires are united to a pile to form a circuit, the magnets exercise a powerful attraction on the rail; but this being immovable, the magnet itself obeys the attraction, and the car attached following, the slight pressure which it still exercises on its wheels is just equal to its weight, minus the attractive power of the magnets."

Now, in the one case, he says artificial magnets and natural loadstones are used, and in the other electro-magnets. There is not the least similarity between the two: the electro-magnet requires a battery on board the car,—the natural loadstone does not. Neither of the two magnets could effect the object at all, and, besides, could the inventor operate it, (which he cannot) it would do the very thing which is desirable to be obviated. The magnet cannot act upon the rail until the rail is also magnetised, and the power of a magnet diminishes according to the square of the distance. The effect of the magnet would also be as strong upon the wheels as the rails, and it would be different from the principles of the magnets were they to be drawn to the rails; the attraction at best, too, would be lateral, not vertical. We are not surprised at the proposition of such an invention, for it requires a great deal of knowledge to know what principles of science are applicable to mechanism.

Mournful Accident.

On the afternoon of Thursday last week, no less than forty-three children were killed in one of our Ward Schools. The cause of the accident was a panic occasioned by one of the teachers being struck with paralysis, and an alarm of fire being raised, which caused the children to rush out to the stairs, and crowding one another over, broke down a railing whereby, they were precipitated down below upon the flags like grain through a hopper, until they lay upon one another, heaped and pent in the struggles of death. The severity of the accident can well be imagined by the great number of little ones who lost their lives—nearly all of whom were suffocated. It was a terrible and heart-rending scene, and has thrown many happy families into the deepest grief. Only for the determination of Mr. McNally, the Principal of the Male Department, the loss of life would have been far greater. He put his back to the door and kept it shut against some larger scholars, who, had they got out, would have dashed all the smaller ones before them. About forty, also, were more or less injured. The stairs appear to have been badly constructed for ready exit from the school. We also condemn the practice of having such large schools. No less than 1300 scholars were attached to this school. In all large schools some of the smaller children are getting hurt all the time, by large scholars. Our country has a very unenviable name among the nations of the earth for murderous accidents. There are more execrable buildings erected around and in the city of New York, than in all the world beside. Many architects, masons, and carpenters, appear to care only about shamming the work out of their hands; there does not appear to be real sterling honesty in their dealing, nor a pride of producing good work, only quantity—quantity. The railing of the school stairs was weak and easily broken down; it was just like the great majority of all our buildings; there is always some miserable and inefficient piece of work left to mark the careless constructor.

Great blame is attached to the firemen for increasing the excitement of the children by their shouting and want of management. We have reason to believe this is correct, from the evidence of eyewitnesses, and some who escaped, as it were, by a miracle.

In connection with the above, we are sorry to add that a fatal accident took place last Monday, by the falling of the walls of a brewery adjoining the Blacksmith Shop of Messrs. Hoe & Co.'s establishment in Sherriff street. The number of persons killed was two, and two wounded. Everybody is to blame for this.

To Inventors.

Inventors who are interested in knowing where they can find agents competent to do their business with the Patent Office Bureau, are reminded that we continue to transact it with our former success and dispatch. We refer to Thomas H. Dodge, Adam Lemmer, S. Curtis, James Hardie, Norris & Flanders, Hale R. Rose, Vine B. Starr, Frederick Fitzgerald, John Ryer, and Silas C. Herring,—whose names appear in this week's list of patents, and to others with whom we have done business.

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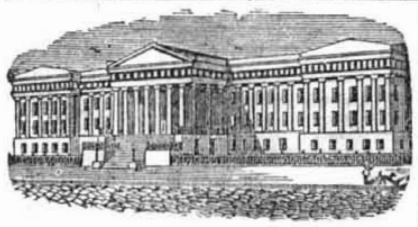

☞ Reported expressly for the Scientific American, from the Patent Office Records. Patentees will find it for their interest to have their inventions illustrated in the Scientific American, as it has by far a larger circulation than any other journal of its class in America, and is the only source to which the public are accustomed to refer for the latest improvements. No charge is made except for the execution of the engravings, which belong to the patentee after publication.

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING NOVEMBER 18, 1851.

To D. R. Hendrix, of Pottstown, Pa., for improvement in Boot Trees.

I claim the set screws, M and N, and plate, in combination with the screw G, substantially in the manner and for the purpose described.

To Alonzo Bascom, of East Jaffrey, N. H., for improvement in apparatus for Sizing and Dyeing Yarns.

I claim, first, the conducting of yarn or thread, from section or warper beams, directly into and through the size or coloring liquids, to the pressure rollers, by a series of rollers more or less in number, placed as nearly in contact with each other, as the nature of the case will admit—the closer the better—sufficient space being allowed between the fixed rollers, for the passage of the yarns or threads, thus enabling the said rollers to operate as guides to each and all the threads, to prevent them from matting or clinging together, and superseding the otherwise necessary use of reeds, raddles, or other separators.

Second, I claim the taking or making of a weaver's lease or leases, at the commencement of the process of warping, or beaming of yarn, or thread, on section or warper beams, and at proper intervals on the same, to correspond with required lengths of yarns or treads, on weaving beams, and preserving the same throughout the sizing and drying, thus dispensing with the use of hacks or lease takers, in the dresser, and the otherwise necessary stoppage of the dresser or sizer, for the purpose of tying or twisting together each separate thread.

To Thos, H. Dodge, of Nashua, N, H., for improvement in Printing Presses.

I claim, first, hanging the type bed and platen upon cranks on rotating shafts, and arranged and operating in the manner substantially as described.

Second, I claim the spring presser attached to the type bed or platen, for the purpose of pressing the band communicating motion to the sheet, against the opposite surface of the platen, or bed, and causing it to be moved at precisely the same speed as the bed and platen, substantially as described.

Third, I claim the arrangement for carrying and giving motion to the inking rollers, consisting of the barrel, the bals, and the lever, springs, and band, combined together with the above type bed and platen, in the manner substantially as set forth.

[See engraving on page 329, Vol. 6, Sci. Am.]

To S. Curtis, of Newtown, Ct., for improvement in machines for Cutting Combs.

I claim the wheel with the cutters placed on its periphery, as described, said wheel having a rotary motion, and also a vertical reciprocating motion, in a transverse line with its axis, for the purpose of turning or cutting comb teeth, substantially as described, said motions being given the wheel by means of the cams, levers, pawls, or their equivalent, as set forth.

To G. W. Gardner, of Albany, N. Y,, for improvement in Stove Grate Bars.

I claim the manner described of forming separate grate bars for vibrating grates, rounded at their end, secured and working in grooves of the frame, as described.

To Henry Golden, of Greensboro', Miss., for improvement in Plows.

I claim a coulter scraper, constructed as described, with a share and mould board projecting from the side of the landside opposite to that which the earth is thrown, the landside thus extending from the point of the scraper to that wing of the mould board opposite the one to which it usually extends; and the several parts being so arranged, that the landside will run deep enough to hold the implement firmly to its work, the share will pare the ground and cut off the weeds near the roots of the plants, and the mould board will conduct the same towards the middle of the space between the rows.

To James Hardie, of Victoria, Texas, for improvement in Propellers of Machinery to be used in Currents.

I do not confine myself to the exact mode of gearing described, as many modifications of the same may be used, and answer equally well; but I claim the application, for the purpose specified, of one or more levers, with the floats or blades at their lower ends, against which the current acts, said levers being attached at about their centres, to an adjustable frame, by a universal joint, as described, the upper ends of the levers being attached to cranks, by which, through any suitable gearing, motion is commnnicated to the shaft, substantially as described.

To Nehemiah Hodge, of Adams, Mass., for improvement in Railroad Car Wheels.

I claim connecting the tread or rim of a car wheel to the hub or central part thereof, by means of india rubber or other analogous elastic material, such elastic material being connected with the outer periphery of the central part of the wheel, by a groove on the latter, or its equivalent, and to the inner periphery of the rim also, by a groove thereon, or its equivalent, the india rubber holding itself in both grooves, by its elasticity, as described.

I also claim the grooved segments, constructed substantially as described, and interposed between the india rubber and the rim, for the purpose of facilitating the insertion of the india rubber into the space between the rim and central part of the wheel and its removal therefrom, as set forth.

To Jehu Hollingsworth, of Zanesville, O., for improvements in Mill for Grinding and Bolting.

I claim, first, the grinding of grain or other matter, by means of a revolving stone or metallic roller, and one, two, or more separately adjustable concaves, whereby high and low grinding may be performed simultaneously, and bolting the same the instant that any particles are ground fine enough, in combination with the returning on to the roller again all particles too coarse to be bolted, through the bolting concave, so that they may be ground over again and again, until they are fine enough to be discharged; and this I claim, whether it is done by means of the revolving beaters and brushes, which throw it up and through the pipe, or by any other means essentially the same.

Second, I claim the guides or partitions in the pipe, as described, to prevent meal from scattering endwise, in its transit from the bolting concave to the roller, in combination with the adjustable aprons, on which it falls, and which distribute and govern it in its passage to the discharging end, as described and set forth.

To Adam Lemmer, of Newark, N. J., for improvement in Cannon for throwing Chain-Shot.

I claim, in combination with the revolving head and the bores, diverging as described, the rack attached to the gun, and the worm wheel hung on the shaft, by which the gun is made to revolve or return to the desired position, so that the chain-shot may be thrown, either in a horizontal or vertical line.

To Gaspard Malo, of Dunkirk, France, for improved Screw Propeller.

I claim arranging two or more series of narrow blades, such as described, each series on a separate shaft and the shafts one within the other, and provided with keys or other equivalent means of securing them to each other, substantially as specified, so that the two or more shafts may be turned on each other and re-secured, to place the series of vanes directly behind each other, for sailing purposes, and at different points of the circle, for propelling.

To Isaac H. Morris & David Flanders, of Parishville, N. Y., for improvement in Desks.

We claim, first, forming the desk top in boxes, parts, or pieces, each of which may be separately raised or lowered, as required, through appropriate mechanical devices, substantially in the manner and for the purposes set forth.

Second, the employment of hinged double leaves in the front of the desk, the same, when extended, forming a rest for the hand, and being made capable of closing down or in, essentially as described.

[See Eng. on page 12; this Vol. Sci. Am.]

To David F. Phillips, of Republic, O., for improvements in Railroad Switch.

I am aware that the relative position of the switch with the main track, or turn-out, or sliding track, has been changed by the action of mechanism attached to the cars, as well as by devices attached to the locomotive in various ways, and therefore I do not claim changing the switch by apparatus, or devices, actuated by the cars or locomotive. Nor do I claim constructing and operating a switch composed of a single movable section of the main rail. But what I claim is the employment of the additional movable sections, D D, in combination with the sections C C, forming the switch, whereby the lateral movement of each is halved or divided in opposite directions, and a more regular curve is produced than that resulting from the use of the single movable section or switch, and thereby insuring safety, the weight of the train of cars on one section of the switch forming a lock to the other section, as one section cannot move without the other, till the train of cars shall have passed therefrom, as set forth.

I also claim the combination of the double central lever bars, with the central connecting rock shaft, having two cranks projecting in opposite directions, to which are attached the cross-bars for uniting the double sections, whereby the switch is adjusted, as fully set forth.

To Wm. Redick, of Uniontown, Pa., for improvement in Seed Planters.

I claim the combination of the slides with the grooves (which "drill" in the grain) and the cells, so that by moving the slats towards the centre of the hopper, to close the communition with the grooves and open it with the cells, for planting in "check rows," or by moving both the slats towards the centre of the hopper, to close the communication between said hopper and the grooves and cells, and open it with the cells for planting in "step rows," the whole being arranged in the manner and for the purpose set forth.

To Wm. W. Riley, of Columbus, O., for improvement in inserting Porcelain Teeth.

I claim the mode of inserting teeth by forming the concave base, and of inserting the platina surface of the teeth in an oblique direction, and attaching them to the gum plate without stays.

To Hale R. Rose, of Guilford, Vt., for improvement in Stoves.

I claim placing the damper between the fire and hot-air flues, so as to control the amount of opening in each, respectively, and governing the same by expansion of the rod, substantially as described, for the purpose of regulating the heat of the oven.

I do not claim the expanding rod irrespective of its connection with the damper, placed as described.

[This improvement will, no doubt, soon come into general use.]

To H. J. Ruggles, of West Poultney, Vt., for improvement in Stove Grates.

I claim the inclined elevator for raising the back grate and coupling it with the front grate, and in combination the connecting the front and back grates with hooks or catches, constructed and arranged substantially as specified.

To John C. Fr. Salomon, of Cincinnati, O., for improvement in Spring Saddles.

I claim the movable pommel, the spiral spring or springs connecting the pommel and cantle, and the rawhide seat, all combined substantially in the manner set forth, making a spring-seat saddle tree.

To Vine B. Starr, of East Hampton, Ct., for improvement in Gongs.

I claim making gongs of sheet or plate iron or steel, with a rim all round, strengthened by a ring or band, the whole being coated and having the crevices, interstices, and all unsound parts filled with an alloy of copper and tin, or any alloy of a similar nature, or composed of similar metals to what is called bell-metal, substantially as set forth.

To Geo. Todd, of St. Louis, Mo., for improvement in finishing and balancing Millstones.

I claim inserting the balance rine in the eye of a millstone, in the early stage of its construction, and then making use of the said balance rine, in conjunction with a chuck combined with a spindle, in completing the stone, substantially as set forth.

DESIGNS.

To Charles Muller, of Tompkinsville, N. Y., for Design for a Hat Stand.

I claim the design and configuration of a hat stand, representing a Triton, or similar figure, holding up the branches of a plant, in the manner aforesaid, with the basin lying in a bed of leaves or flowers, all arranged substantially as set forth.

To Frederick Fitzgerald, (assignor to S. C. Herring & John Ryer), of New York City, for Design for Iron Railing.

To Apollos Richmond, (assignor to A. C. Barstow & Co.), of Providence, R. I., for Design for Parlor Stove Grates,

Funnels of Steamships Affecting Compasses.

Capt. Johnson, R. N., has given considerable attention to the effect of telescopic funnels of steamships. In a letter to Col. Sabine, he says:—

"I wish you to bring under notice the following results which I obtained with reference to the effect of hollow iron cylinders upon the compass, when placed inside each other, the object being to ascertain whether the whole difference of deviation, under the two conditions of these telescopic funnels was due to the difference of their elevation and depression only, or whether a portion of the said differences was attributable to the induced magnetism of the separate parts of the funnel, when lowered, acting upon each other. As it would have required more time than could be afforded to hoist the parts of those huge funnels in and out of the ship, while the requisite succession of observations were made, I procured three hollow iron cylinders of smaller dimensions, their several diameters being such as to admit of one cylinder being placed inside of another, and leaving a space of about one-eighth of an inch between their surfaces. Having placed a standard compass on one of the pedestals in the observatory, and ascertained the magnetic meridian for the moment by the collimator, the largest or external iron cylinder (No. 1) was brought in and placed to the eastward of the compass, the principal mass of the cylinder being below the level of the needle and card, and its upper end being 2½ inches above that level. By this means a deflexion or deviation of 10° 10′ was produced, the north end of the needle being drawn that amount to the eastward of the correct magnetic north. Cylinder No. 2 was next placed inside of No. 1, when the deviation was increased to 12° 15′. Cylinder No. 3 was then placed inside of No. 2, and the deviation was again increased to 14° 15′, the north end of the needle being drawn to the eastward in each case. Hansteen's Magnetic Intensity instrument was then placed with the centre of its needle (as nearly as I could adjust it) in a similar position to that which the course of the compass had occupied, and the following results were obtained:—Time of 100 vibrations, starting from an arc of 18°—

Previous to the cylinders being brought into the observatory	6′ 57″
No. 1 cylinder in place	6′ 51″
No. 2 cylinder in place inside of No. 1	6′ 47″
No. 3 cylinder in place inside of No. 2	6′ 45″

The intensity instrument being removed, a dipping needle was then employed, and the following are the results of the observations:

	Dip.
Previous to the cylinders being brought into the observatory	68° 37′
No. 1 cylinder placed to the south of the instrument	70° 10′
No. 2 cylinder in place inside of No. 1	70° 27′
No. 3 cylinder in place inside of No. 2	70° 37′

The conclusion to be deduced from all these observations appears to be, that to the deduced magnetism of the surfaces of the cylinders acting upon each other is due a portion of the deviation; and reasoning by analogy, a similar deduction is applicable to the telescopic funnels of steamships."

It is said that a perpendicular waterfall has been discovered on the Sonomas river, Oregon, some distance above where it empties into Puget's Sound, of 260 feet.

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TO CORRESPONDENTS.

A. L., of N. Y.—Every steam boiler is a vacuum pan, it may be said; the only air that is in one is that of the water; your plan would save nothing.

B. M., of R. I.—A long time prior to the establishment of galvanism as a science, it had been observed that if two different metals were placed in contact, under water, they were subject to a rapid oxidation, though the water had no perceptible action upon them when they were alone. It had also been observed that ancient inscriptions, made of some metals, were totally defaced, while those made of pure metals were in excellent preservation. It is a beautiful science, and it is yet in its infancy.

S. W., of Texas.—It would be impossible for us to accomplish all you desire for the want of time and facilities to attend to it; parties from this section would not be willing to undertake such a risk without positive assurance of success.

J. L. O., of Lynn.—We think your plan of spring bedstead new and patentable, and request you to send a model; as to whether it will pay or not depends upon contingencies not properly within our province to decide upon.

T. C., of Va.—We have not time to write you a full receipt about the Chromatype. The supply pipe for your water ram is not material, but as your discharge pipe is five inch dia. (a very large size, truly) it will require a fall of 12 feet to raise all the water 12 feet, or a 6 feet fall to raise half the water, or 4 feet to raise one-third the supply of water; this is not counting a little loss by friction; you can therefore judge what size of supply pipe you require.

W. J. J., of Mass.—We have none of the numbers of Vol. 4 that you ordered.

S. H., of Ind.—The idea of applying steam directly to the periphery of a wheel to act by its expansive force to propel it, is well known to those familiar with the history of the rotary engine.

W. B. H. of Ohio.—You say you are poor; we are honest. We could not obtain a patent for your invention, much as you think of it, and we therefore would not wish you to lose your money. We would say the same to a rich man. No power can be gained from a lever, as you know. The old revolving buckets and rollers, we think, are preferable to your plan, because the weight of the water is applied nearly vertically, but there are mechanical difficulties in the way of your plan, as in the old bucket plan.

W. J., of Pa.—The best material you can use for the floats, is india rubber; it is the dearest, but there is nothing like it for air-tightness. The Goodyear India Rubber Warehouse, this city, will furnish you with what you want, but perhaps you can find one of them in the India Rubber Company stores in Philadelphia.

F. H. M., of N. Y.—When the application for the patent is filed, it is policy, usually, to substitute new claims, although you can retain such as were made in the caveat, if you prefer.

G. K, of O.—Minifie's Drawing Book is probably the best work you could procure as a text book:—price $3; postage by mail, 64c., which must be prepaid.

C. F., of N. Y.—The copy of the Sci Am., that we sent you, will be convincing proof, we think, that your invention is very old.

W. S., of S. C.—Dr. Reid resides in Rochester, N. Y., and could doubtless afford you such information about the sumac as you desire, and we think you would do well to communicate with him upon the subject. It would cetainly afford us much pleasure to do so were it possible.

G. B., of Ark.—We should be pleased to see your drawings, but probably could not publish them during this Volume. The series of papers on Hydraulics, which were published in last Volume, will satisfy for the present.

G. M. C., of Me.—H. can use his machine just as he pleases after getting a patent; he may sell or not, as he likes, No one has a right to make or sell his machine. If he took more than two years to perfect his machine, B has no right to use it in any shape. If he has had it in public use for more than two years before applying for a patent, he will, in all likelihood, lose all the advantages of it. It is his duty to apply for a patent or file a caveat before the two years expire.

K. E., of N. Y.—Your plan for whitening sugar by creating a vacuum under the drainer, is a very good and practicable plan, but it will not refine sugar so fast as the new Centrifugal Machines, which can be made to work with greater rapidity.

Money received on account of Patent Office business for the week ending November 24.

N. A., of Ct., $30; S. M. P., of N. Y., $20; E. L. N., of Mass., $32; W. Mc., of N. Y., $35; J. H. C., of Ohio, $30; A. S., of Pa., $10; G. F. F., of Mo., $50.

J. W. M, J. V. H., F. H. M., and J. C. E.—Your papers have been sent to the Patent Office.

Sending Receipts.---Postage on Books.

The Post Office Laws do not allow publishers to enclose receipts; when the paper comes regular subscribers may consider their money as received.

Subscribers ordering books or pamphlets are particularly requested to remit sufficient to pay postage.

An Important Paragraph.

To preclude subscribers the necessity of writing for back numbers of the Scientific American, we shall forward all the back numbers of Volume 7, dating their subscriptions from the commencement unless they instruct to the contrary. We shall send the back numbers issued on this Volume until No. 13, after that time the names will be entered from the date of the reception of orders, unless the writer expresses a wish to receive the back numbers.

Whenever our friends order numbers they have missed—we always send them if we have them on hand. We make this statement to save time and trouble, to which we are subjected in replying when the numbers called for cannot be supplied.

Back Numbers and Volumes.

In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:

Of Volumes 1, 2 and 3—none.

Of Volume 4, about 20 Nos.; price 50 cts.

Of Volume 5, all; price, in sheets, $2; bound, $2,75.

Of Volume 6, all price in sheets, $2; bound, $2,75.

ADVERTISEMENTS.

Terms of Advertising.

One square of 8 lines, 50 cents for each insertion.
" 12 lines, 75 cts., " "
" 16 lines, $1,00 " "

Advertisements should not exceed 16 lines, and cuts cannot be inserted in connection with them at any price.

American and Foreign Patent Agency

IMPORTANT TO INVENTORS.---The undersigned having for several years been extensively engaged in procuring Letters Patent for new mechanical and chemical inventions, offer their services to inventors upon the most reasonable terms. All business entrusted to their charge is strictly confidential. Private consultations are held with inventors at their office from 9 A. M., until 4 P. M. Inventors, however, need not incur the expense of attending in person, as the preliminaries can all be arranged by letter. Models can be sent with safety by express or any other convenient medium. They should not be over 1 foot square in size, if possible.

Having Agents located in the chief cities of Europe, our facilities for obtaining Foreign Patents are unequalled. This branch of our business receives the especial attention of one of the members of the firm, who is prepared to advise with inventors and manufacturers at all times, relating to Foreign Patents.

MUNN & CO., Scientific American Office,
128 Fulton street, New York.

LOGAN VAIL & CO., No. 9 Gold street, New York, agents for George Vail & Co., Speedwell Iron Works, have constantly on hand Saw Mill and Grist Mill Irons, Press Screws, Bogardus' Horse-Powers, and will take orders of Machinery of any kind, of iron and brass; Portable Saw-mills and Steam Engines, Saw Gummers of approved and cheap kind, &c. Gearing, Shafting, large and small, cast or of wrought iron. 11tf

WANTED—By a middle-aged man, a situation where he could make himself generally useful by book-keeping, drawing machinery and architecture, with a house or engine builder, or railroad constructor, or in a factory of any description; and could teach drawing and French. Has no objection going to any part of the Union. Direct answer to E. B. French, Chatham Square Post Office, N.Y. 11 3*

THE SUBSCRIBER has on hand several improved Steam Engines of superior quality, and made of the best materials, particularly adapted to manufacturing, saw mills, flour mills, &c. He will also make to order, at the shortest notice, engines and boilers of from 2 to 50 horse power, with all their appendages; prices reduced. Also, shafting, mill gearing, saw mills, presses, drills, &c. He has also facilities for furnishing lathes, planes, and scroll chucks, of the most approved styles and patterns, at short notice. Chain pumps always on hand, wholesale and retail, at No. 4 Howard st., New Haven, Ct.
10 7* AARON KILBORN.

TWO STEAM ENGINES FOR SALE—Of 3 and 6 horse-power (new); price $150 and $200; also, now finishing, 1 1-2 doz., more of those superior 8 feet Slide and Screw Cutting Lathes; price, including counter shaft, hangers, pulleys, and full set of gearing, $250. Inquire of CARPENTER & PLASS, corner of Hester and Elizabeth streets, N. Y. 10 2*

THE SATURDAY EVENING POST, THE Leading Literary Weekly in the Union.—The proprietors think it unnecessary to dwell upon the distinguishing features of the "Post," whose brilliant success, during an existence of thirty years, is a sure guarantee of the future. For the coming year we have made arrangements for the following nouvellets:—"Eoline, or Magnolia Vale," by Mrs. Caroline Lee Hentz, author of Linda, Rena, &c.; "Trial and Triumph," by T. S. Arthur, author of The Iron Hand, Temperance Tales, &c. &c., &c. The "Post" will also contain, weekly, choice selections, news, bank note list, state of markets, &c. Terms—Single copy, $2 per year, or three years for $5, in advance. Clubs (to be sent to one P. O.), 4 copies, $5; 9 copies, $10; 14 copies, $15; 21 copies, $20, in advance. Address always post-paid. DEACON & PETERSON, 66 south 3rd st., Philadelphia. A copy of the "Post" will be sent as a specimen to any one. 10 5

JOHNSON'S UNEQUALLED SAW GUMMER for gumming out the teeth of saws, an article indispensible for saw mill owners. This article has been thoroughly tried and well approved, for sale by G. A. KIRTLAND, 205 South street, New York. 9 4*

McCORMICK'S PATENT REAPERS AND MOWERS.—1700 of these machines, for which the great Medal of the World's Fair was awarded, are being manufactured at Chicago, Ill, with the intention of supplying the South-eastern States for the next harvest The gold medal of the Chicago Institute was recently awarded for this Reaper and Mower, tested against two other mowers, in cutting prairie grass; and the first premium of the State Agricultural Societies of Wisconsin, Michigan and Pennsylvania, were also awarded at their late Fairs. Price $120 at Chicago, and $122 delivered at Philadelphia; terms otherwise accommodating. 9tf

BALLOONS.—I am prepared to manufacture Hydrogen Balloons of from 1 pound to 50,000 lbs. ascending power to order. Balloons capable of carrying up one or two persons always on hand. The Balloons will be of the most perfect construction, so that any person can, with certainty and safety ascend with them. Instructions to insure success given to purchasers gratis. JOHN WISE, Lancaster, Pa. 9 10*

TRAUTWINE ON RAILROAD CURVES.—By John C. Trautwine, Civil Engineer, Philadelphia; just published and for sale by WM HAMILTON, Actuary of the Franklin Institute Price $1.

"This is a really good work, and we heartily recommend it to our civil engineers."—[Scientific Am.

"We have carefully examined this work, and regard it as the best that has yet appeared on the subject," &c.—[Am. Railroad Jour. 8 10*

POST'S PATENT SLIDING DOOR FRONTS—For Stores and Public Buildings; a new, cheap, and simple fixture for securing store fronts, which renders them fire and burglar proof, has been invented and patented by the subscriber, who is now prepared to sell rights. Messrs. Quarterman & Son, 114 John st., N. Y., are general agents. Address (post paid) Wm. POST, Architect, Flushing, L. I. 6 3m

TILTON's Patent Violin.—The undersigned having patented his Violin Improvement, is prepared to exhibit it to the public. Being now in New York, he may be found at No. 18 Park Place (Mr. J. Wiley's), where he will be pleased to see such gentlemen as take an interest in his invention. All communications addressed "Wm. B. Tilton & Co.," as above, or at Carrolton, Pickens Co., Ala.
3 12* WM. B. TILTON.

LEBOW & BLODGETT'S PATENT ROTARY SEWING MACHINE.—The undersigned, having purchased the right to use, sell, and manufacture these machines for the States of Alabama and Mississippi, and their other business engagements preventing them from giving it their personal attention, they are disposed to sell out their right to the above-mentioned States, or counties in them, if preferred, upon favorable terms. To an energetic and industrious man we will sell upon such terms as will insure a large and handsome profit. Apply to Mr. W. SCRUGGS, of the firm of Messrs. Scruggs, Drake & Co., Charleston, S. C., or to WM. MAILLER, Decatur, Ala. 4 8*

PROFESSOR ALEX. C. BARRY'S TRICOPHEROUS OR MEDICATED COMPOUND.—Professor Barry does not hesitate to put his Tricopherous, for the two grand requisites of efficacy and cheapness, against any preparation for cleansing, renewing, preserving, and strengthening the Hair, that has ever been advertised or offered for sale. He challenges the associated skill and science of the medical world to produce, at any price, an embrocation that will reduce external irritation, cure ordinary cutaneous diseases and severe cuts, sprains, pains, &c. Sold in large bottles, price 25 cents, at the principal office, 137 Broadway, New York, and by the principal merchants and druggists throughout the United States, Canada, Mexico, West Indies, Great Britain, France, &c. 4 12*

CLOCKS FOR CHURCHES, PUBLIC BUILDINGS, RAILROAD STATIONS, &c., and REGULATORS FOR JEWELLERS.—The undersigned having succeeded in counteracting effectually the influence of the changes of the temperature upon the pendulum, and introduced other important improvements in the construction of clocks, are prepared to furnish an article, superior in every respect (the highest grade warranted to vary less than two minutes in a year) to any made in the United States. Ample opportunity will be afforded to test their qualities. Glass (illuminated) dials of the most beautiful description furnished. Address SHERRY & BYRAM, Oakland Works, Sag Harbor, Long Island, N. Y.

"At the Oakland Works of Sherry & Byram there are made some of the finest clocks in the world."—[Scientific American.

"Mr. Byram is a rare mechanical genius."—[Jour. of Commerce. 5 10

PATENT CAR AXLE LATHE—I am now manufacturing, and have for sale, the above lathes; weight, 5,500 pounds, price $600. I will furnish a man with each lathe, who will turn and finish axles for 50 cents each, if desired. I have also for sale my patent engine screw lathe, for turning and chucking tapers, cutting screws and all kinds of common job work, weight 1500 lbs., price $225. The above lathe warranted to give good satisfaction. J. D. WHITE, Hartford, Ct. 7 6m*

MACHINERY FOR SALE—Four dead spindle filling frames, 1-16 strand speeder, 1 warper, 1 lapper, &c. Also turbine water wheels, 6 ft. diameter, of most approved patterns, at $275 each; a breast wheel, &c.; 20 feet long, and an iron under-shot water-wheel. ELI WHITNEY.
New Haven, Oct. 22, 1851. 7 6*

IRON FOUNDERS MATERIALS—viz.: fine ground and Bolted Sea Coal; Charcoal, Lehigh, Soapstone and Black Lead Facing. Iron and brass moulding sand; Fire Clay, Fire sand and Kaolin;—also English, Scotch and Welsh Fire Bricks—plain arch, circular and tower cupola—for sale by G. O. ROBERTSON Liberty place, between 57 and 59 Liberty-st. (near the Post Office) N. Y. 7 12*

A CARD.—The undersigned begs leave to draw the attention of architects, engineers, machinists, opticians, watchmakers, jewellers and manufactures of all kinds of instruments, to his new and extensive assortment of fine English (Stubs) and Swiss Files and Tools; also his imported and own manufactured Mathematical Drawing Instruments of Swiss and English style—which he offers at very reasonable prices. Orders for any kind of instruments will be promptly executed by F. A. SIBENMANN Importer of Watchmakers' and Jewellers' Files and Tools and manufacturer of Mathematical Instruments 154 Fulton st. 6 9*

BROOM MACHINERY.—The most improved and durable machinery for the manufacture of Brooms, for sale by JACOB GRAY, Scotia, Schenectady Co., N. Y. Address post-paid. 4 8*

PALMER'S ARTIFICIAL LEGS.—Manufactured at Springfield, Mass., and 376 Chestnut-st. Philadelphia, by Messrs. Palmer & Co.—All orders from New York and New England must be made to Palmer & Co. Springfield, Mass.—"I have examined carefully the Artificial Leg, invented by Mr. B. F. Palmer; its construction is simple and its execution beautiful; and what is most important, those who have the misfortune to require a substitute for a natural limb and the good fortune to use it—all concur in bearing practical testimony to its superiority in comfort and utility. VALENTINE MOTT.
New York, Jan. 29, '51. 39 6meow*

1851 TO 1856.----WOODWORTH'S PATENT Planing Machines.—Ninety-nine hundredths of all the planed lumber used in our large cities and towns continues to be dressed with Woodworth's Machine. Price of the machine from $150 to $760. For rights in the unoccupied towns and counties of New York and Northern Pennsylvania, apply to JOHN GIBSON, Planing Mills, Albany, N. Y. 9 10*

SCRANTON & PARSHLEY, Tool Builders, New Haven, Conn., have on hand six 12 ft. slide lathes, 28 in. swing; also four 8 ft. do.; 21 in. swing, with back and screw gearing, with all the fixtures; one 5 ft. power planer; 12 drill presses, 4 bolt cutting machines, 30 small slide rests; 5 back geared hand lathes, 21 in. swing; 15 do. not geared; 8 do. 17 in. swing on shears 5 1-2 feet; 25 ditto with and without shears, 13 in. swing; counter shafts, all hung if wanted suitable to the lathes. Scroll chucks on hand; also index plates for gear cutting. Cuts of the above can be had by addressing as above, post-paid. 9tf

BEARDSLEE'S PATENT PLANING MACHINE, for Planing, Tonguing and Grooving Boards and Plank.—This recently patented machine is now in successful operation at the Machine shop and Foundry of Messrs. F. & T. Townsend, Albany N. Y.; where it can be seen. It produces work superior to any mode of planing before known. The number of plank or boards fed into it is the only limit to the amount it will plane. For rights to this machine apply to the patentee at the abovenamed foundry—or at his residence No. 764 Broadway; Albany. GEO. W. BEARDSLEE. 5tf

WATTS & BELCHER, Manufacturers of Steam Engines, Lathes, Planing Machines, Power Presses, and Mechanics' Tools of all descriptions. Orders respectfully solicited and punctually attended to. Washington Factory, Newark, N. J. 7 20*

PAINTS, &c. &c.—American Atomic Drier, Graining Colors, Anti-friction Paste, Gold Size, Zinc Drier, and Stove Polish.
QUARTERMAN & SON, 114 John st.,
9tf Painters and Chemists.

MACHINERY.—S. C. HILLS, No. 12 Platt-st. N. Y. dealer in Steam Engines, Boilers, Iron Planers, Lathes, Universal Chucks, Drills; Kase's, Von Schmidt's and other Pumps; Johnson's Shingle Machines; Woodworth's, Daniel's and Law's Planing machines; Dick's Presses, Punches and Shears; Morticing and Tennoning machines; Belting; machinery Beal's patent Cob and Corn mills; Burr mill and Grindstones; Lead and Iron Pipe &c. Letters to be noticed must be post-paid. 1tf

LAP-WELDED WROUGHT IRON TUBES for Tubular Boilers—from 1 1-4 to 7 inches in diameter. The only Tubes of the same quality and manufacture as those so extensively used in England Scotland, France and Germany—for Locomotive Marine and other steam Engine Boilers.
THOS. PROSSER & SON, Patentees,
1tf 28 Platt-st. N. Y.

LATHES FOR BROOM HANDLES, Etc.—We continue to sell Alcott's Concentric Lathe, which is adapted to turning Windsor Chair Legs, Pillars, Rods and Rounds; Hoe Handles, Fork Handles and Broom Handles.

This Lathe is capable of turning under two inches diameter with only the trouble of changing the dies and pattern to the size required. It will turn smooth over swells or depressions of 3-4 to the inch and work as smoothly as on a straight line—and does excellent work. Sold without frames for the low price of $25—boxed and shipped with directions for setting up. Address (postpaid) MUNN & CO.,
At this Office.

MALLEABLE IRON FOUNDRY, EASTON, Mass.—The subscriber continues to manufacture castings of every variety, for machinery and other purposes, of the best quality, at the above establishment, we have facilities for making castings 5 1-2 feet in length. Persons wishing castings can send patterns to Easton Express, Boston, Mass. All letters will be promptly attended to.
8 10* DANIEL BELCHER.

WOOD'S IMPROVED SHINGLE MACHINE—Patented January 8th 1850, is without doubt the most valuable improvement ever made in this branch of labor-saving machinery. It has been thoroughly tested upon all kinds of timber and so great was the favor with which this machine was held at the last Fair of the American Institute that an unbought premium was awarded to it in preference to any other on exhibition. Persons wishing for rights can address (post-paid) JAMES D. JOHNSON, New Haven, Ct.; or WM. WOOD, Westport; Ct., All letters will be promptly attended to. 37tf

LEONARD'S MACHINERY DEPOT, 109 Pearl-st. 60 Beaver N. Y.—The subscriber is constantly receiving and offers for sale a great variety of articles connected with the mechanical and manufacturing interest, viz.: Machinists' Tools—engines and hand lathes; iron planing and vertical drilling machines; cutting engines, slotting machines; bolt cutters; slide rests; universal chucks &c. Carpenters' Tools—mortising and tennoning machines; wood planing machines &c. Steam Engines and Boilers from 5 to 100 horse power. Mill Gearing—wrought iron shafting; brass and iron castings made to order. Cotton and Woolen machinery furnished from the best makers. Cotton Gins; hand and power presses. Leather Banding of all widths made in a superior manner; manufacturers' Findings of every description. P. A. LEONARD. 10tf

MANUFACTURE OF PATENT WIRE Ropes and Cables—for inclined planes, suspension bridges, standing rigging, mines cranes, derick, tillers &c.; by JOHN A. ROEBLING; Civil Engineer—Trenton N. J. 47 1y*

RAILROAD CAR MANUFACTORY—TRACY & FALES, Grove Works, Hartford, Conn. Passage, Freight and all other descriptions of railroad Cars, as well as Locomotive Tenders, made to order promptly. The above is the largest Car Factory in the Union. In quality of material and in workmanship, beauty, and good taste, as well as strength and durability, we are determined our work shall not be surpassed. JOHN R. TRACY,
39tf. THOMAS J. FALES.

BEST CAST STEEL AXLES AND TYRES, (a new article,) for Railroad Carriages and Locomotives. The quality of this steel is sufficiently attested in the announcement that it has carried off the first prizes awarded at the World's competition of 1851, in London. The axles are in general use on the Continent, and are now offered in competition with any other that can be produced; and to be tested in any way that may be desired by the engineers of the United States, either by impact or by torsion. This steel is manufactured by Fried Krupp, Esq., of Essen, in Rhenish Prussia, represented in the United States by THOS. PROSSER & SON, 28 Platt st., N. Y.
2tf.

TO ENGINEERS.—A new Work on the Marine Boilers of the United States, prepared from authentic Drawings and Illustrated by 70 Engravings—among which are those of the fastest and best steamers in the country—has just been published by B. H. BARTOL, Engineer, and is for sale at the stor of D. APPLETON & CO.,
1 12* 200 Broadway.

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SCIENTIFIC MUSEUM.

Scientific Memoranda.

ARSENIC EATERS IN AUSTRIA.—A poisoning case at Chili has procured the publication of some interesting facts respecting the arsenic eaters of Lower Austria and Syria. In both of these provinces it appears to be a common custom among the peasantry to consume every morning a small portion of this deadly poison in the same manner as the eastern world consumes opium. Dr. Tschudi, the well known traveller, publishes an account of several cases which have come to his knowledge. The habit does not seem to be so pernicious in its results as that of opium-eating. It is commenced by taking a very small dose, say somewhat less than half a grain, every morning, which is gradually increased to two or three grains. The case of a hale old farmer is mentioned, whose morning whet of arsenic reached the incredible quantity of four grains. The effect it produces is very curious. The arsenic-eaters grow fat and ruddy, so much so that the practice is adopted by lovers of both sexes, in order to please their sweethearts. It relieves the lungs and head very much also when mounting steep hills and entering into a more rarified atmosphere.

[It is well known that Napoleon, for fear of being poisoned, it is said, by the same process as that practiced by the Austrian peasants, became inured to take a quantity at once which would kill three men. Some have inured themselves by degrees to take as much prussiac acid as would kill four or five men. Tobacco is a poison, and if a person who never took a chew in his life, was to use for one half day as much as some of our old chewers do, his coffin would have to be purchased before the sun went down. We do not believe a single word about the useful and good effects of the arsenic mentioned above, it is untrue in essence and principle. The writer of this has inhaled no small amount of arsenic in his litetime, and with it an equal amount of injury to the system; of this he has no doubt, although he has always been able to snap his fingers at the doctors.

PROFESSOR GORINI.—This gentleman, who is professor of natural history at the University of Lodi, made, before a circle of private friends, two nights ago, a very remarkable experiment illustrative of his theory as to the formation of mountains. He melts some substances known only to himself, in a vessel, and allows the liquid to cool. At first it presents an even surface, but a portion continues to ooze up from beneath, and gradually elevations are formed, exactly corresponding in shape with those which are found on the earth Even to the stratification the resemblance is complete, and M. Gorini can produce on a small scale the phenomena of volcanoes and earthquakes. He contends, therefore, that the inequalities on the face of the globe are the result of certain materials, first reduced by the application of heat to a liquid state, and then allowed gradually to consolidate.

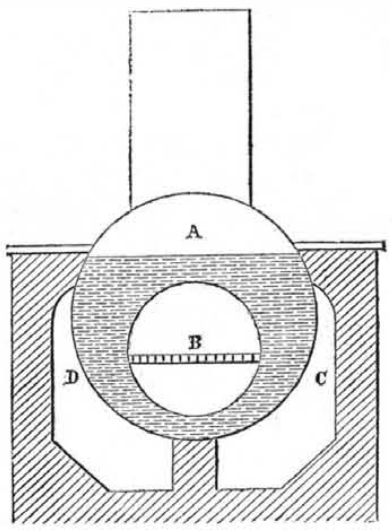
In another and more practically useful field of research the learned professor has developed some very important facts. He has succeeded to a most surprising extent in preserving animal matter from decay without resorting to any known process for that purpose. Specimens are shown by him of portions of the human body which, without any alteration in their natural appearance, have been exposed to the action of the atmosphere for six and seven years; and he states that, at a trifling cost he can keep meat for any length of time, in such a way that it can be eaten quite fresh. The importance of such a discovery, if on a practical investigation it is found to answer, will be more readily understood when it is remembered that flocks of sheep in Australia are boiled down to tallow, their flesh being otherwise almost valueless, and that in South America vast herds of cattle are annually slaughtered for the sake of their hides alone.

[The theory stated above to be practically demonstrated by Gorini, respecting the elevations and depressions of the earth, is the same as that of our oldest philosophers who have written upon the subject. They believed that our earth was at one time a comet, or a part of one, and was a hot molten mass.

His discovery of the preservation of meats, is perhaps the use of purified coal oil—naptha—the nature of which is asserted to be preservative. The meat, however, has not a very good flavor, and is inferior for true usefulness to the meat biscuit of Mr. Gail Borden.

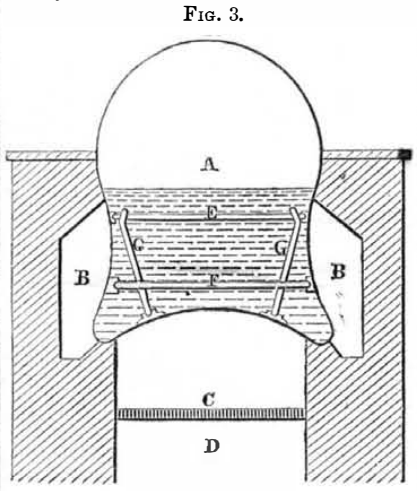
On Boilers.---No. 2.

Fig. 2.



SMALL CORNISH BOILER.—The accompanying figure 2 is a transverse section of a small *Cornish Boiler*. A is the boiler; B is the furnace; C D are the flues, and E the steam-dome. The shell of the boiler is 5¼ feet in diameter and 9 feet long; it has a cylindrical fire tube flue running through it, and in this respect is different from figure 1 (last number). The flue is 2 feet 10 inches in diameter and contains the furnace and grate-bars, like all Cornish boilers. The fire grate consists of 25 bars, 7-8ths of an inch thick on the top surface, and there is 3-8ths of an inch space of draught between each two. The bars are 4 feet long, and the width of the grate is 2 feet 9 inches, or 11 square feet of area. It is so made with a removable brick bridge that the whole or less area may be used. The current of flame and hot air first passes from the fire through the flue tube, to the back of the boiler, whence it returns under one side of the shell to the front, round to the other side, D, through which it proceeds to the chimney in a continuous, or what is termed the "wheel-draught;" it has a steam dome in section, 2½ feet by 3 feet 2 inches and 3 feet 10½ inches,

FIG. 3.



equal to about 24 cubic feet, making the total capacity of the boiler 170 cubic feet. The heating surface is 2·8 × 3·1416×9½=83·55 square feet. Taking the upper half only as the effective heating surface, it is equal to 41·77. In measuring the side surface in all boilers set up in this way there is a difficulty in fixing the proper line where the proper surface ends and the side begins. But as the side flues are gathered in about 6 inches above the central line of the boiler, it appears fair to consider the side to extend to the same distance below as would make it equivalent to so much vertical surface; the sides, therefore, will be 1 foot deep by 2×9½ long, half of which being effective, amounts to 9·5 square feet. The bottom surface, therefore, consists of all the rest of the shell exposed to the heat, except that portion occupied by the central supporting wall, or 5·25×3·1416÷2—1·75×9·5=61·718 square feet, which, added to the tube and side surface, gives the total effective heating surface equal to 112·988, which, divided by 9, gives 12·55 square yards.

The general results of this comparison with figure 1 (in last number) show that while the Cornish boiler is very little larger than the cylindrical boiler, it has 50 per cent. more of area in heating surface, with a great deal less water—a little over half. The economical results, in practice, are therefore found to be much greater—it saves half as much fuel. In places where wood is burned as fuel, this boiler is vastly superior to the plain cylinder boiler. This boiler being only 3 inches wider and 6 inches longer than the cylindrical boiler of last week, is of much greater horse-power—evaporative utility. If we allow 6 square feet of heating surface for a horse-power, the comparison will stand thus:—cylindrical boiler, fig. 1, 5×1·5×9÷6=9·75, horse-power; Cornish boiler, figure 2, 5·25×2·8×9·5÷6=12·7 horse-power.

WAGON-SHAPED BOILER.—Fig. 3 is a transverse section of the Wagon-shaped Boiler; it is a view of one 20 feet long, 5 feet wide, and 6 feet 8 inches deep. Such a boiler is capable of supplying steam for a 20 horse-power engine, with a moderate consumption of fuel. A is the boiler; B B are flues, with a wheel-draught, made the same way as that described in figure 2. C is the grate; D is the ash pit; E F and G G are stays and straps, which are always required for strengthening this kind of boiler, which, owing to its form, is much inferior to the cylindrical boiler. The fire-grate is 5 feet long and 4 feet wide. The grate-bars are about 2 inches thick on the upper face; the spaces between are about 3-8ths of an inch wide. The grate is set with a fall of three inches to the back, and is about 21 inches from the boiler bottom at the front, and 24 inches at the back. The upper part of this boiler is a semi-cylinder, containing 5²×20÷2=250 cylindrical feet, ×·7854=196·35 cubic feet. (This rule, used to find the cubic contents, is, squaring the diameter, 5² feet, and multiplying by ·7854 for the area, and that by 20 feet, the length for the cubic contents of a cylinder, which, divided by 2, gives the cubic contents of the semi-cylinder of the boiler). The lower part is made with straight sides, and if it had a flat bottom it would be equal to 4·166×5×20=416·66 cubic feet; but the small concavity of the bottom reduces this about 1-6th, which makes its contents to be =347·22 cubic feet, which, if added to the above, makes 196·35+347·22=543·57. If this is divided by a cubic yard, 27 square feet, we have 20·13 cubic yards of boiler—its capacity. A little less than half this space is allowed for water and the remainder for steam.

A rule for finding the depth of water in this boiler, when the steam and water chambers are of equal capacity, is as follows:—Take half the difference of capacity between the lower and upper part, and divide it by the area of the water surface, then deduct the quotient from the depth of the lower part of the boiler, and the remainder is the depth of water, taken perpendicularly over the seating plate, at the bottom of the boiler, when the capacity for water is equal to that for steam, and which it ought never to exceed. In this case—

Capacity of the lower part	347.22	cubic feet.
Ditto of the upper part	196·35	do.
	2) 150·87	
Area wat. surface, 5×20=100)	75·43	=half diff
Quotient	·7543	
Subtract from depth of lower part	4·1666	
Remainder in feet .	3·4123	
	12	
And inches . . .	4·9476	

Hence 3 feet 5 inches nearly is the depth of the water.

The brickwork of the side flues is gathered in 3 inches below the surface, hence the depth of the side surface is about 3·25 feet, or measuring by the curved surface, about 3·5 feet, and the total area of both sides=3·5×40=140 square feet. The total area of the two ends of the boiler below the tops of the flues is about 28 square feet—less by the area of surface covered by the brick arch over the furnace mouth (about 3 square feet), and by the brickwork at the back, which divides the "uptake" from the side flue (about 2 square feet), leaving about 23 square feet, which, added to the side surface, gives 163 square feet, for the total area of vertical surface; but, as we have already seen, only one half of this can be considered as effective heating surface—it is only equal to 81½ square feet, or little more than 9 square yards.

The area of the boiler bottom, measured by the curved surface, amounts to 94 square feet, or about 10½ yards, which is all effective; hence the total effective heating surface of the boiler is about 19½, or say nearly 20, square yards.

Volcanic Eruption in the Sandwich Islands.

A paragraph in a San Francisco paper says, that the Crater in Manua Loa, Sandwich Islands, had emitted a vast amount of lava, which was flowing off in a southwest direction, at the rate of about three miles in twenty-four hours. From the course taken by the stream, it is thought it will reach the sea somewhere to the southward of Kealakekua.

LITERARY NOTICES.

THE EXPOSITOR—A weekly illustrated Recorder of Inventions, Design, and Art Manufactures, published by Joseph Clayton, Jr., Fleet street, London, at $5 per annum. We have received the first 52 numbers of this publication; the first 26 numbers are, in our estimation, the most beautiful specimens of a scientific journal we have ever seen; we anticipated its arrival on this side of the Atlantic with much pleasure, especially during the progress of the Great Exhibition; but we are sadly disappointed, for, ever since the Crystal Palace opened its gorgeous display, this paper has been filled with the most nauseating and useless trash, wholly devoid of interest to a scientific mind, but tolerably agreeable for children, a sort of cross-breed between an illustrated primer and a comic almanac. Every number contains an engraving of a piece of cabinet ware, jewel case, stuffed bird, monkey, cat, rabbit, or some other subject, "stale, flat, and unprofitable," and far inferior, in point of real merit, to what we see every day in show-windows along our famous Broadway. We may reasonably complain of the bare-faced impudence of the proprietor in raising the price of the journal and then sponging the subscribers, out of that which, under a lower price, rendered the work interesting, viz., good illustrations, good paper and good matter; surely this is rather ahead of us Yankees, for we would rather miss the figure by such tricks. If the Expositor has succeeded to a paying position, we might reasonably inquire of what materials are our transatlantic friends composed? If it has not, we would imagine that our cotemporary might become remunerative whenever balloons succeed in supplanting the iron horse, a sort of airy dream, requiring for its feasibility a great stretch of imagination.

NATURAL HISTORY OF THE HUMAN SPECIES.—This is a re-print of Lieut. C. H. Smith's work, with an introduction by L. Kneeland, Boston. The publishers are Messrs. Gould & Lincoln, of Boston. The introduction is long and very interesting; but we think the views of the editor, which are the same as those of Agassiz, are not borne out by stout facts or strong reasoning. The Natural History of Man is a very interesting subject, but satisfactory conclusions will never be arrived at respecting the two views held by different writers on this very difficult subject. These views are, 1st, "that all mankind have descended from one pair:" Pritchard, Dr. Smythe, of S. C., hold to this doctrine. 2nd. That mankind are descended from various original pairs—all human." Agassiz, Kneeland, &c., entertain the latter opinion. For an exposition of the various views on both sides; we commend this work to all readers.

TO MECHANICS,

Manufacturers, and Inventors.

SEVENTH VOLUME OF THE

SCIENTIFIC AMERICAN.

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AMERICAN & FOREIGN PATENT AGENTS,

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